LIBRARY
OF THE

MASSACHUSETTS
AGRICULTURAL
COLLEGE

B26

SOURCE_____

M. A. C.
COLLECTION

Digitized by the Internet Archive
in 2011 with funding from
Boston Library Consortium Member Libraries

http://www.archive.org/details/bulletin1919univ

MASSACHUSETTS
AGRICULTURAL
COLLEGE
LIBRARY

The M. A. C. Bulletin

Amherst, Mass.

-11-

1919

- Contents -

v. 11

1. Agriculture and Reconstruction

2. Fifty-sixth annual report of the Massachusetts Agricultural College Part 1 1919

3. Six weeks' course in agriculture for soldiers and sailors offered by the Massachusetts Agricultural College February 10-March 22, 1919

4. Catalog of the Massachusetts Agricultural College 1918-1919 Fifty-sixth annual report Part II

5. Announcement of the Twelfth Summer School June 30-July 26

6. Announcement of the Two-Year Course in Practical Agriculture

7. The Ten Weeks' Winter School 1919-1920

8. Not published

The M. A. C. Bulletin, Amherst, Mass.

Published eight times a year by the Massachusetts Agricultural College
January, February, March, May, June, September, October, November

Volume XI JANUARY, 1919 Number 1

UNIT OF THE STUDENT ARMY TRAINING CORPS AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

Over one thousand graduates and students from the College have served in the great war

Agriculture and Reconstruction

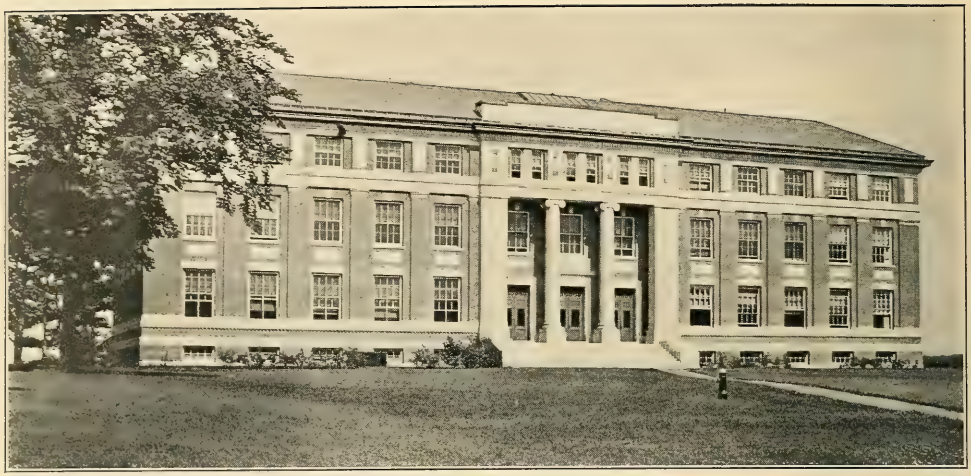
THE great world war has ended. And now the peoples of the world face the stupendous and inevitable task of reconstruction. This task will tax the resources and leadership of the world fully as heavily, though in a different way, as has the prosecution of the great war. Belgium, Northern France, Serbia, Russia and other vast areas must be rebuilt. The social, industrial and political status of the nations must be re-established and developed in harmony with the fundamental principles of brotherhood and democracy.

Not the least of the problems of economic readjustment are those of providing food for the world, guiding its economic distribution and assuring its proper use and conservation. For the next few years in particular, these problems are certain to command the attention of every one seriously concerned in the vast work of reconstruction.

If we are to feed the world properly and economically and at the same time insure a condition of rural life which is both sound and attractive, we shall need thousands of agricultural and food experts adequately and scientifically trained. The agricultural colleges of the country for fifty years have been training leaders for just such tasks and fortunately they are equipped to increase the output of trained men and women to meet the demands.

What the Massachusetts Agricultural College can do

The Massachusetts Agricultural College, continuing its long established service to the state and nation, is prepared to train men and women for leadership in the various agricultural vocations. The following may be especially emphasized:



STOCKBRIDGE HALL, MAIN AGRICULTURAL BUILDING

Contains offices, class rooms, and laboratories for various agricultural departments. Attached to this building is Bowker Auditorium, the largest assembly hall on the campus, seating nine hundred persons

(1) PRODUCERS: The problem of the production of food is of first importance. Students attending the Massachusetts Agricultural College, learn how to farm profitably. General farming, dairying, stock raising, poultry husbandry, fruit growing and vegetable gardening are the practical studies which receive primary emphasis.

(2) DISTRIBUTING AGENTS: Not only must food be produced economically but it must be carried to the consumer at the minimum cost and with the minimum waste. The Massachusetts Agricultural College has long emphasized the necessity of training experts who can study and help solve the intricate problems of the efficient distribution of food.

(3) CONSERVATION EXPERTS: Food must also be utilized to the best advantage and that portion which we have been accustomed to waste or regard as by-product must be saved whenever possible. The subject of food preservation is one which is strongly stressed in the curriculum of the Massachusetts Agricultural College.

(4) SCIENTIFIC EXPERTS: In order to meet the ever recurring ravages of insect pests and plant diseases met in crop production and the difficulties in food preservation growing out of chemical and bacterial changes, there must ever be a corps of trained experts qualified to advise and cope with these problems and with those which arise anew each year. The Massachusetts Agricultural College has scientific departments recognized the country over as among the best for the training of these scientific experts.

(5) AGRICULTURAL ADVISERS: The majority of farmers cannot avail themselves of the full advantages of the resident instruction provided at the agricultural college. Recognizing the need of assisting these farmers on their own farms, a system of county agricultural advisers has been developed over the entire country. This is perhaps the most important enterprise recently undertaken in behalf of the agricultural industry. The Massachusetts Agricultural College is able to train men for the important work of the agricultural adviser.

(6) FORESTRY: The Massachusetts Agricultural College gives an adequate training for the practice of forestry on the farm and also a preliminary training for commercial forestry.

WILDER HALL, HEADQUARTERS FOR THE DIVISION OF HORTICULTURE
Provides offices, class rooms, and laboratories for pomology and landscape gardening

(7) AGRICULTURAL TEACHERS: The demands are ever increasing for men and women qualified to teach agriculture or some of the scientific subjects related thereto. Graduates of the Massachusetts Agricultural College are holding important positions as teachers and administrators in agricultural colleges, high schools and agricultural schools.

(8) MISCELLANEOUS VOCATIONS: Other agricultural vocations more or less directly related to the problem of food supply for which the Massachusetts Agricultural College trains men and women are floriculture, landscape gardening, agricultural journalism, agricultural business, home making, and social work in rural communities.

Courses at the Massachusetts Agricultural College

In training for agricultural leadership the Massachusetts Agricultural College has developed the following series of courses:

(1) FOUR-YEAR COURSE FOR THE B. S. DEGREE.

Open to high school graduates meeting entrance requirements similar to those of other colleges.

Trains for practical farming as well as for the various agricultural vocations to which reference is made in the preceding paragraphs.

(2) SPECIAL COURSES OF COLLEGE GRADE IN TECHNICAL AGRICULTURE AND HORTICULTURE not leading to a Degree.

Open to high school graduates or those who have had the equivalent of a high school course.

Trains principally for farm management.

(3) TWO-YEAR COURSE IN PRACTICAL AGRICULTURE.

Open to young men and women seventeen years of age or over who have had at least a common school education.

Trains efficiently for practical, profitable farm management.

Students may take a general or specialized agricultural course.

THE FARM BARNS

Four of the leading breeds of dairy cattle are represented in the college herd which consists of 160 head. The college estate comprises 600 acres of land used for the farm, orchards, gardens, experimental plots and the campus; also 750 acres of woodland serve as a demonstration forest

(4) WINTER SCHOOL. (Ten Weeks.)

Open to young men and women above sixteen years of age, but organized primarily for adults.

Intensive study of problems of farm management.

Begins about the first of January.

(5) SUMMER SCHOOL. (Four Weeks.)

Offers work especially adapted to teachers and other workers in agriculture.

Begins about the first of July. Instruction is given in various practical agricultural subjects, in the sciences relating thereto and in rural social science.

(6) GRADUATE SCHOOL.

Applicants must be college graduates. The courses given are for the training of highly specialized experts in the various agricultural vocations.

General Information

COST. The tuition to all the above courses is free to citizens of Massachusetts. The expense for board, room, laboratory fees, books, etc., averages at present about $10 per week. There are various opportunities for needy students to earn a part of their expenses and in some courses cash scholarships covering a portion of the cost are available.

Since the College was opened in 1867, military drill has been required of all its students enrolled in the four-year course.

The opportunities for lucrative employment in the various agricultural vocations for which the Massachusetts Agricultural College trains men and women are almost without limit. No graduate of any of these courses who has made a good record has failed to secure an attractive position. The new world-wide demand for agricultural leadership will broaden the scope and increase the attractiveness of these opportunities.

For a detailed catalog of any of the above courses, address

Ralph J. Watts, Secretary,
Massachusetts Agricultural College,
Amherst, Massachusetts.

THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. XI. No. 2 February, 1919

Published Eight Times a Year by the College
Jan., Feb., Mar., May, June, Sept., Oct., Nov.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE, AMHERST, MASS.

Public Document No. 31

FIFTY-SIXTH ANNUAL REPORT

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE

PART I

REPORT OF THE PRESIDENT AND OTHER OFFICERS OF ADMINISTRATION

FOR FISCAL YEAR ENDED NOV. 30, 1918

Public Document No. 31

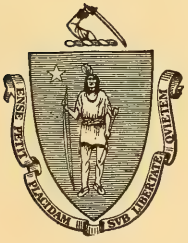
FIFTY-SIXTH ANNUAL REPORT

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE

PART I

REPORT OF THE PRESIDENT AND OTHER OFFICERS OF ADMINISTRATION FOR FISCAL YEAR ENDED NOVEMBER 30, 1918



FEBRUARY, 1919

Publication of this Document
approved by the
Supervisor of Administration.

CONTENTS.

PAGE

Report of the President of the College: —

The Massachusetts Agricultural College and the War, . . . 7

The Review of the Year, ... 14

Departments of Undergraduate Instruction, ... 32

Graduate School, ... 34

Short Courses, ... 34

Experiment Station, ... 34

Market Garden Field Station, ... 36

Extension Service, ... 37

The Scope of the College Task, ... 40

The Immediate Needs of the College, ... 41

The Food and Feed Supply Problem in Massachusetts, . . . 44

Tables and Statistics, ... 49

Financial Report of the Treasurer, ... 59

The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Nov. 30, 1918.

To His Excellency Samuel W. McCall.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part I of the fifty-sixth annual report of the trustees, for the fiscal year ended Nov. 30, 1918, this being the report of the president of the college and other officers of administration to the corporation.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

REPORT OF THE PRESIDENT OF THE COLLEGE.

Gentlemen of the Corporation.

I herewith submit my annual report as president of the Massachusetts Agricultural College for the year ending Nov. 30, 1918, and with it transmit reports from other administrative officers of the institution.

THE MASSACHUSETTS AGRICULTURAL COLLEGE AND THE WAR.

In common with many other institutions, our college work has, on account of the war, been materially affected during the past year. The college year 1917–18 was reduced in length to three terms of nine weeks each. It was thought that under the circumstances substantially all of the work normally given in twelve weeks could be crowded into the shorter terms. This did not prove to be the case, however, and partly because of this shortening and partly because of the general unrest which affected college men all over the country, the academic work of the year was not entirely satisfactory.

The present college year opened at the normal time, September 25, and it was our intention to shorten the year by two weeks only. The cessation of the war, however, has so altered the situation that we will resume the normal schedule of three terms of twelve weeks each.

Students' Army Training Corps.

On May 8, 1918, the War Department announced its plan for establishing a Students' Army Training Corps in practically every American college. This plan provided for the enlistment in the army of boys from eighteen to twenty-one years old, and their assignment to colleges for one, two or three years' work, and, under certain conditions, for even a longer period. The purpose of this plan was to maintain the normal attendance at

the colleges, and at the same time to train men for officers and for certain expert service in the army.

The modification of the selective service law in August, whereby the draft age was lowered to eighteen, would have depleted almost to the last man the attendance at the men's colleges. The provisions of the S. A. T. C. were immediately adjusted to meet the new situation. Our institution accepted the opportunity to operate under these provisions. These conditions may briefly be stated as follows: men formerly enrolled in the college, and those between the ages of eighteen and twenty-one who were able to meet the entrance requirements, were allowed to enter college as usual in the autumn. These men were inducted into the army as regular soldiers, and as such received the pay of privates, namely, $30 per month, and were clothed, housed, fed and trained at government expense. A contract was made with the institution for the housing, feeding and medical care of the men. The War Department furnished the necessary military staff. These soldiers were required to take military drill and certain academic subjects prescribed by the War Department. Such time as remained was to be utilized by the soldiers in the pursuance of such academic courses as they should choose.

At the outset we were given to understand that boys twenty years of age would probably be allowed to remain in the college three months; nineteen years of age, six months; and eighteen years of age, nine months. The plan further contemplated distributing members of the S. A. T. C. at the end of each three months' period; their military and scholastic records would be examined, and, on the basis of these joint records, one of three things would be done with the man: (1) he would be sent to an officers' training school; (2) he would be allowed to remain at the college for further technical training; and (3) if he had shown no special aptitude, either for military work or for the technical training desired in the army, he would be sent to a depot brigade as a private. Men thus transferred from the college were to be replaced by detachments assigned from depot brigades, who would be chosen as being qualified to benefit by three months' training at the college. The vacancies could also be filled by high school boys completing their course during the

year. The plan further contemplated keeping the college open during the entire year.

The final regulations by the War Department allowed us to admit men who had completed fourteen units of high school work in any subject. On this basis a number of men were admitted to the S. A. T. C. who would not have been admitted as regular students.

The S. A. T. C. was formally established Oct. 1, 1918. We originally asked to be allowed to enroll 350 men, but when the applications exceeded this number our quota was increased to 400; the total enlistment was 351, with 12 others taking the work as civilians.

Early in October, by direction of the War Department, the best qualified members of the S. A. T. C. were transferred to officers' training schools, and prior to November 12, 60 of these men were thus transferred. No other men, however, were assigned to take their places.

With the signing of the armistice on November 11 the plans for the S. A. T. C. were immediately interrupted. Finally, on November 27, it was announced that the S. A. T. C. would be disbanded not later than Dec. 21, 1918.

Under the requirements of the S. A. T. C. certain educational experiments were undertaken, some of which seemed to represent the foundation of beneficial reforms in educational methods. Sufficient opportunity, however, has not been given for the adequate testing of these methods.

In harmony with the expressed wish of the War Department, that soldiers be housed under conditions approximating as nearly as possible the barracks arrangement at cantonments, we have utilized the dormitory rooms in North and South College, housing five to seven men in suites formerly occupied by two or three men. To supplement these accommodations we have used certain rooms in French Hall and in Draper Hall. The soldiers have been fed at Draper Hall.

This institution has been especially fortunate in the personnel of the military staff which was assigned for the training of our soldiers. Too high praise cannot be given to the entire staff for their enthusiasm, efficiency and qualities of leadership. The staff consists of the following: Col. R. H. Wilson (retired),

Capt. G. E. Rifenbark, Lieut. Curry S. Hicks (personnel officer), W. E. S. Dickerson, E. J. Costello, L. L. Cunningham, F. Dehls, D. C. Chalmers, J. T. Dave and Sergt. J. J. Lee (retired).

War Work of the Institution.

The institution has continued during the year its policy of co-operating with State and Federal agencies in the war program of food supply, distribution and conservation. A large part of our war work is performed through the extension service, and in co-operation with the county farm bureaus. With a farm bureau in each agricultural county, and with our staff of agricultural experts continually in the field, the service both to the producer and consumer of food has been inestimable. In the summer of 1918, for the second season, the regular teaching staff of the institution did a vast deal of additional work. It is difficult to totally enumerate the service thus rendered. Men gave up their vacations, and in many instances took up work outside of their normal field of teaching. It is not possible to give sufficient credit to the individual members of our staff, who have, during the war, played the part of soldiers, and have worked to the limit of their time and strength.

During the summer of 1918, also, a very large percentage of our students engaged in farm work, or were employed in munition factories or in the production of other war supplies.

The Students and Alumni in Military Service.

The number of students and alumni in war service, according to our latest records, is represented by the following table: —

	Total in Service.[1]	S. A. T. C.	Commissioned Officers.	Overseas.	Deaths.
Faculty,	18	–	7	3	–
Graduate students,	12	–	1	2	1
Total,	30	–	8	5	1
Class.					
1878,	1	–	1	–	–
1882,	2	–	2	1	–
1885,	2	–	2	1	–
1890,	1	–	1	–	–

[1] Includes Red Cross and Y. M. C. A. officials.

	Total in Service.	S. A. T. C.	Commissioned Officers.	Overseas.	Deaths.
Class — Concluded.					
1891,	1	–	–	1	–
1892,	1	–	–	1	–
1894,	1	–	1	–	–
1895,	2	–	1	2	–
1897,	4	–	4	3	–
1898,	1	–	–	–	–
1900,	2	–	1	1	–
1901,	1	–	–	–	–
1903,	2	–	2	1	–
1905,	2	–	2	1	–
1906,	5	–	3	2	–
1907,	4	–	3	2	–
1908,	6	–	5	3	–
1909,	6	–	1	4	–
1910,	12	–	6	3	1
1911,	15	–	5	8	1
1912,	36	–	17	15	–
1913,	37	–	18	16	4
1914,	54	–	17	24	2
1915,	65	–	21	25	–
1916,	96	–	25	35	–
1917,	128	–	40	46	5
1918,	128	–	57	56	5
1919,	119[1]	20	29	40	6
1920,	110[1]	47	12	19	3
1921,	77[1]	66	4	–	–
1922,	78[1]	79	–	–	–
Unclassified,	38[1]	14	3	11	3
Total,	1,067	226	291	326	31

[1] Includes S. A. T. C. men enrolled as regular students.

It is indeed an inspiration to realize that over 1,000 "Aggie" men, chiefly young men of classes of the last ten years, have made such a definite contribution to the winning of the war. The percentage of commissioned officers is most creditable. The reports which come to us of the individual conduct of our men in the war reflect the highest credit upon them. Almost

without exception our men have acquitted themselves admirably, and in many cases have won military distinction.

It is with a feeling of sadness, but at the same time of pride, that we think of our men who have gone into this great struggle never to return. Up to the present time 31 graduates and former students of the college have given their lives in the war; 22 of these have died in France, either in action or as the result of wounds; 3 have been killed in aviation camps in America; and 6 have succumbed to disease. I think it will be appropriate for the college at some date in the near future to recognize the supreme sacrifice made by these men by a proper memorial service, and certainly by an adequate memorial which will permanently express our appreciation of their loyalty and patriotism.

War Records.

Careful records of the M. A. C. men in war service have been kept by the secretary of the college, and in October a bulletin was issued giving the names, class, home address and military address and rank of all men in the service on date of September 1 whose records had been received. The total at that time was 731, with 221 commissioned officers and 274 men overseas. It is planned to prepare during the coming year a more complete list of these men, and also to bring together in one volume other historical data bearing upon the contribution which our institution has made in this world struggle.

Depletion of the Staff.

As was to be expected our staff has been further depleted during the year by the younger men leaving for war service. The names of men who are on leave of absence for this purpose are found in Table IV at the end of this report. A few other men have resigned their positions in order that they may enter military service.

Welfare Work.

When the campaign for the combined war charities was organized in November of this year our students and faculty alike responded most generously. The total contribution of 379 students, including S. A. T. C. men and regular students, was

over $4,000. Practically every student made a contribution. The total raised in the institution, including the faculty, clerks and laborers, was $7,575.

As soon as it was known that a detachment of soldiers would be stationed here a faculty committee was appointed to undertake such welfare work in behalf of the soldiers as should be required. Working in co-operation with this committee the International Y. M. C. A. has placed on the campus a competent secretary who has done much to assist the soldiers and regular students. The Social Union Room in North College has been placed at the disposal of the committee, and has been utilized as Y. M. C. A. headquarters.

REVIEW OF THE YEAR.

Regular Students.

In addition to the 363 soldiers who were enrolled, and who were composed of men who would normally be classified as seniors, juniors, sophomores, freshmen and unclassified students, we had at the beginning of the collegiate year 97 regular and 19 unclassified students pursuing normal college work. Twenty-nine women students were included in the above, and the remainder were boys under eighteen years of age, a few who had been rejected from military training on account of physical disability, and a few who were eligible to continue their college work for other reasons. There were 7 men and 3 women enrolled in the graduate school. Because of the small enrollment in the upper two classes it was not thought expedient to continue the major system on the normal basis; two majors were therefore offered, — one embodying the subjects formerly offered in the divisions of agriculture, horticulture and the department of agricultural economics, and the other, a combined major in science. The work offered the freshmen and sophomores was only slightly changed from the usual schedule.

The college rented the Kappa Sigma and Phi Sigma Kappa fraternity houses for use as dormitories for the girls. The interests of the other fraternity houses were pooled, and the houses have been used as far as has been possible for the accommodation of men students outside of the S. A. T. C.

A comparative analysis of this year's attendance is found in Table VI.

Fuel Shortage.

The college, in common with other institutions both public and private, was affected by the fuel shortage of the winter of 1918. Early in January, when the situation was most critical, the Bowker Auditorium, Wilder Hall and the Mathematics Building were closed. While considerable inconvenience to instructors and students was thus caused, all co-operated heartily in meeting the emergency.

The Influenza Epidemic.

Full induction of the S. A. T. C. was delayed because of the prevailing influenza epidemic. It was deemed advisable to cancel all large gatherings, and for a period of over four weeks no classes were held for the soldiers, their time being employed in out-of-door drilling. Draper Hall was reserved temporarily for hospital quarters, but fortunately it was not necessary to make this use of the building. Strict rules relative to quarantine were enforced. The State Department of Health congratulated the college "for the admirable way in which the situation was handled, and your remarkable showing for health." About 25 cases of influenza were reported among the students and soldiers; none of them, however, were serious. At the present time the second wave of the influenza, which was predicted by physicians, has come, and a number of cases have occurred.

Two members of our regular staff and the herdsman at the barn succumbed to this disease. Mr. Stuart C. Vinal, assistant in entomology in the experiment station, contracted the disease while on duty in the vicinity of Boston, and died September 26. Mr. Vinal was a graduate of this college in the class of 1915, and had pursued advanced study in entomology. He had been employed by the experiment station ever since graduation, first as part-time assistant, and since September, 1917, as assistant entomologist. He was regarded as a young investigator of unusual promise.

Mr. John J. Barber, the farm superintendent, after a severe illness of about two weeks, died October 3. Mr. Barber had served most acceptably as farm superintendent for nearly six years. As a competent farmer, a skillful manager of men and a genial companion his loss is keenly felt.

Mr. Maurice Calif, herdsman at the barn, contracted the disease, and after a brief illness of three days died on November 19.

New Departments.

During the year two new departments have been established. The department of horticultural manufactures has been contemplated and urged for many years; the war has emphasized the need of such a department, and formal recognition has been

now given to this work by the election of Walter W. Chenoweth, formerly associate professor of pomology, as head of the department of horticultural manufactures. No adequate facilities are as yet available for the proper conduct of the work of this department. At present the activities are carried on at the cold-storage plant, the dairy building and one of the sheds attached to the horticultural barn, while the office of the head of the department is located at Wilder Hall. It is hoped that at a not far distant date a suitable building for teaching and investigations in horticultural manufactures may be provided. A vast amount of extension work has been done in this subject, and the demand will without doubt continue.

Although funds were not appropriated by the last Legislature for the construction of a women's building, and for the adequate maintenance of a women's department, it was the unanimous opinion of the trustees that the college could not longer disregard the demand made upon it for instruction in home economics and allied subjects for women. Accordingly Miss Edna L. Skinner has been elected professor of home economics, and will take up her duties Jan. 1, 1919; she will also serve as adviser of women students. Miss Skinner comes with a training and experience which admirably qualify her to undertake her important task here. She is a graduate of the Michigan State Normal School, and has specialized in home economics at Columbia University, from which institution she has a degree. She has taught household arts at Columbia for four years, has been director of household science at James Millikin University for five years, and during the past year has been teaching at Pine Manor, Wellesley, Mass.

Resignation of Dr. Gates.

Prof. Burton N. Gates, head of the department of beekeeping since 1910, resigned at the beginning of the present college year to accept a similar position at the Ontario Agricultural College.

Death of Mr. Hosmer.

On May 28 Hon. Frank A. Hosmer of our Board of Trustees passed away very suddenly. The following resolutions were presented and adopted at the special meeting of the trustees held October 2: —

In Memoriam.

Frank Alvan Hosmer, member of this Board since January, 1911, died at his home in Amherst on the twenty-seventh day of May last.

Born Nov. 14, 1853, in Woburn, and educated in its public schools, he entered Amherst College in 1871, was graduated there in 1875, and in 1878 received its M.A. degree for postgraduate work in history and political science.

After graduation he taught in the schools of Woburn, Brimfield and Palmer, and from 1879 to 1888 he held the dual positions of principal of the high school and superintendent of schools in Great Barrington. From 1888 to 1890 he was editor and publisher of the "Berkshire Courier" in Great Barrington, and a correspondent of the "New York Herald."

For ten years, from 1890 to 1900, Mr. Hosmer was president of Oahu College at Honolulu, where he became prominent in social and civic affairs and sanitary problems, and in political activities that culminated in the establishment of Hawaii as a territory of the United States. He returned to the States in 1900, and after visiting England and France, settled in Amherst in 1901.

During the last eighteen years he has served loyally and well his town, State and country — for the common interests of the community in which he lived — in many lines of public and community service, and particularly in these later days he had devoted his energies without stint to activities in support of the world-wide war for humanity.

Mr. Hosmer represented the Third Hampshire District in the General Court of 1908 and 1909, was appointed by Governor Draper in December, 1910, a member of this Board, and reappointed by Governor McCall January last for another term.

Here he has served continuously, and with diligence and faithfulness unsurpassed, upon the trustee committees on finance, course of study and faculty, and on legislation, of which committee, during the last years of his service, he was chairman.

He has always shown a broad, liberal and sympathetic spirit in construing the objects and upholding the standards of the college, and in striving to make those objects and standards effective through the work of its various departments.

He was cordial and sympathetic toward all. He laid hold on opportunity gladly, accepted responsibility cheerfully, and undertook manfully whatever work or duty came to his hand, until in a night he was taken, after a life filled to its last day with the purpose and privilege of high calls to service, bravely met and faithfully answered; be it therefore

Resolved, That this memorial be inscribed upon the records of the Board; and that a copy hereof be sent to his beloved wife, to whom we offer our deepest sympathy.

Mr. Hosmer's place on the Board of Trustees was filled by the appointment by Governor McCall of Mr. Carleton D. Richardson of West Brookfield, who brings to his service on the Board the experience of a successful farmer, and a leadership in agriculture represented by his distinguished service as master of the State grange and in various other public capacities.

Commencement.

Owing to the fact that so many members of the class who would have graduated in 1918 were absent in war service, it was thought advisable to arrange a simple and yet dignified commencement program. The date set for this occasion was Saturday, April 27. Commencement was held in the forenoon at Bowker Auditorium. President George C. Creelman of the Ontario Agricultural College gave an interesting address on "The Duty of the Trained Agriculturist in the Present Crisis and After." Brief remarks were made by Lieutenant-Governor Calvin Coolidge, and the degrees were awarded by the president. Following these exercises an informal reception was held for the seniors and their friends, and a luncheon was given at the dining hall to 150 seniors, guests and faculty members. Altogether, it was felt that the plans as carried out met the situation admirably. There were 42 seniors present to receive their degrees in person; 3 of this number were women. In addition, 12 degrees were awarded to members of the class who had attended the institution during the year but were at that time absent on war service.

Resignation of Dr. Brooks.

On account of ill health Dr. William P. Brooks, director of the experiment station, was granted a leave of absence on March 1, 1918: subsequently he resigned as director of the experiment station. His resignation was accepted by the trustees to take effect October 1, but he is retained as consulting agriculturist of the experiment station. January, 1919, will be the thirtieth anniversary of Dr. Brooks' service as professor of agriculture, and agriculturist for the experiment station; for twelve years he has been director of the experiment station, and

for one and one-half years was acting president of the college. The following resolution was adopted by the trustees in appreciation of this long and effective service: —

The trustees of the Massachusetts Agricultural College, having received the resignation of Dr. William P. Brooks as director of the experiment station, after a service to the college as professor of agriculture, acting president and director of the experiment station, covering a period of almost thirty years, and having accepted the same, the members of the Board wish to express their appreciation of his long and faithful service to the college, and hope that he may be able to complete the compilation and publication of the results of the experimental work which he has carried on for so many years.

Legislative Appropriations.

The Legislature of 1918 was requested to appropriate $136,845 for improvements at the power plant and at the dining hall, and for other improvements and for equipment; $28,500 for further improvements at and maintenance of the market-garden field station; and $100,000 for a women's building and the maintenance of women's work. The amounts granted were as follows: —

Improvements at dining hall,	$12,000
Improvements at power plant,	54,500
Improvements and equipment,	20,000
Improvements at and maintenance of market-garden field station,	16,500

Improvements and New Construction.

The Legislature granted $54,500 for improvements to the power plant, and contracts have been let for a new turbine house, a new 300 kilowatt Curtis turbine and generating set, and new equipment for handling coal with a mechanical stoker; this will reduce the labor costs at the power plant to the minimum. A new smokestack, 160 feet from the base to the top, and having an interior diameter of 7 feet, has also been constructed. The Legislature also granted $12,000 for improvements to the dining hall; these have been practically completed, and include a new refrigerating plant with six compartments, and a new storage for potatoes and coal.

Women at College.

You will recall that there was presented to the last Legislature a bill asking for an appropriation of $100,000 for women's work at the college, not over $70,000 of which was to be used for a building to house the work in its earlier stages, the remaining amount to be used for salaries and maintenance. The Legislature referred the matter to the next General Court, and so we have had no funds to develop the work properly. We have, however, as stated previously, engaged a head of a department of home economics and also a woman agriculturist. There is little doubt but there will be a very large demand, both in short and long course work, for women trained in agriculture. There are other phases also of the food supply problem, such as home use of food and food conservation, in which women will find a normal field of work. Rural home making ought to be one of the main objectives of women's work at the college. For all this we will need dormitories, a staff of teachers and adequate maintenance.

The College a State Institution.

The college authorities have contended constantly that the college is and always has been a State institution. However, when the constitutional amendment was passed providing that public funds should not go for the support of educational institutions not under public control, it seemed best to the trustees that a bill should be introduced which should set at rest any possible technical questions. The Commission on the Investigation of Agricultural Education held the same opinion. The Legislature made some important changes, and I think rather unfortunate changes, in the original bill. The resulting law is as follows: —

Chapter 262, General Acts of 1918.

An Act to dissolve the Corporation of the Massachusetts Agricultural College and to provide for the Maintenance of the College by the Commonwealth.

Be it enacted, etc., as follows:

Section 1. The Massachusetts Agricultural College, incorporated by chapter two hundred and twenty of the acts of eighteen hundred and

sixty-three and acts in amendment thereof and in addition thereto, is hereby dissolved, and hereafter the college shall be maintained by the commonwealth as a state institution under the name of the Massachusetts Agricultural College. The commonwealth shall settle the affairs of the corporation, and shall be subject to its legal obligations and liable for its lawful debts.

Section 2. The present trustees of the said corporation shall be the trustees of the state institution, and shall hold office as such until the expiration of the several terms for which they were appointed, unless sooner removed. The power of appointment of their successors and the power of removal of trustees shall be exercised by the governor with the advice and consent of the council. An appointment to fill a vacancy occurring prior to the expiration of the term of a trustee shall be for the unexpired part of the term, and all other appointments shall be for the term of seven years. The governor, the commissioner of education, the secretary of the state board of agriculture, and the president of the faculty of the college shall be, ex-officiis, members of the board of trustees. The number of appointive trustees shall never exceed fourteen.

Section 3. The powers and duties heretofore conferred and imposed upon the trustees of the Massachusetts Agricultural College, are hereby conferred and imposed upon the trustees of the state institution, the Massachusetts Agricultural College, who shall manage and administer any grant or devise of land, and any gift or bequest of money or other personal property, made to the commonwealth for the use of said institution, and shall carry out said trusts, and shall invest the proceeds thereof in notes or bonds secured by good and sufficient mortgages or other securities. All property now held by the corporation, the Massachusetts Agricultural College, upon special trusts shall be managed and administered by said trustees in behalf of the commonwealth in accordance with the provisions of such special trusts.

Section 4. All expenditures for the maintenance of the institution shall be authorized by a majority of the trustees, or by a majority of a duly appointed committee of the trustees. Complete records and files of the pay rolls and bills shall be kept in the office of the treasurer. A complete accounting of all receipts and expenditures of the institution from all sources shall be made by the trustees to the governor annually. There shall be a complete audit of the accounts of the institution, including all receipts and expenditures, under the direction of the trustees at least twice a year, and also under the direction of the auditor of the commonwealth, whenever he may deem it proper. Monthly statements of receipts and expenditures shall be rendered by the treasurer to the auditor. The expenditure of special appropriations shall be under the direction and control of the trustees, and shall be accounted for in the same manner as appropriations for maintenance.

Section 5. All employees of the institution shall be considered state employees, but shall not be subject to the civil service laws and regulations.

SECTION 6. All acts and parts of acts which apply to the present Massachusetts Agricultural College shall continue in force and apply to the Massachusetts Agricultural College hereby created so far as they are not inconsistent with this act.

SECTION 7. This act shall take effect upon its passage. [*Approved May 31, 1918.*

The auditing authorities at the State House are inclined to rule rather closely that under the new act all provisions for the conduct of State departments, boards and institutions strictly apply to the college. Doubtless the acts of the trustees, and particularly all the financial transactions of the college, should be subject to review. But we are now required to conform to practices and rules which were apparently never intended to apply to the college, and which, if rigorously enforced, make in our judgment for delay, annoyance and even inefficiency.

COUNTY FARM BUREAUS.

By reason also of the constitutional amendment, the county farm bureaus were required to reorganize as public agencies, two plans for which were discussed and presented to the Legislature. The one tied the county farm bureaus very closely to the extension system now administered by the college, and to the United States Department of Agriculture; the other made quite independent institutions out of each farm bureau. The latter policy finally prevailed. It is evident that we must go through a period of adjustment of our extension service to the work to be done in each county through the county farm bureau. Whatever the legal authority, respectively, of the bureaus, or of the college, or of the Federal Department of Agriculture, the three must be closely knit by real co-operation into a unified system of popular agricultural education.

THE STATE DEPARTMENT OF AGRICULTURE.

Under the constitutional amendment the Board of Agriculture, which had rendered the State a significant and important service for sixty-five years, was abolished, and a new Department of Agriculture was established. It still remains for the college and the department to work out the details of a division of labor which will prevent overlapping of activities.

The Smith-Hughes Act.

The so-called Smith-Hughes Act of Congress provides Federal appropriations to each State in the Union which will supplement the grant, with State appropriations, for the purpose of developing vocational education of secondary grade in the industries, in agriculture and in home economics. The State authority for the expenditure of these funds is the State Board of Vocational Education, which in Massachusetts is the State Board of Education. The principal immediate interest of the college in this act lies in the preparation of teachers of agriculture. We are working out a plan by which the college will become the training center for these teachers. Here, again, is exemplified the need of co-ordination of these new activities with those of the college, as a part of what will ultimately be a comprehensive State system of agricultural education.

Short Courses.

The short winter courses were started in the college about 1900, and were very greatly enlarged in 1908. In my report to your Board for the year 1915, I said: "I am convinced that the time has arrived when these short courses must be developed more fully, and fitted more completely into the State system of agricultural education." The main reason why I have not heretofore presented a comprehensive project for this enlargement was the lack of funds for the purpose. Under the five-year plan of financial support there was need for all the money for existing projects. Now we are enabled to ask the Legislature for whatever money we feel we need. Furthermore, the war has made these short courses vitally necessary.

A resolve of the Legislature for 1918 reads as follows: —

Resolved, That in the opinion of the general court there should be established at the Massachusetts Agricultural College a two years' course in practical agriculture upon the completion of which certificates of graduation should be granted, that the course should be open to all residents of the commonwealth who have attained the age of seventeen years and who possess the educational qualifications necessary for admission to any public high school of the commonwealth.

The response of the college is indicated by the following votes passed by the Board of Trustees in October: —

Voted, That the college offer a course of study that will meet the intent and spirit of the Legislature of 1918, as embodied in the Senate Bill No. 374.

And further, it was —

Voted, That, recognizing the impracticability of organizing a course to cover two full years under present conditions, there shall, during the ensuing college year, be offered substantially a four months' course for students having at least a grammar school education, and who are not less than sixteen years of age, if, in the judgment of the faculty of the college, such a course seems to be feasible and practicable during the war emergency.

Prof. John Phelan, head of our department of rural sociology, has been appointed director of short courses, and has entered upon his important duties with characteristic energy, enthusiasm and thoroughness.

I wish to call attention to the following statement of the director, embodying a plan for the immediate enlargement of the work, which has been approved by your Board: —

The Nature of Short-course Work.

Short-course work, for convenience of classification, includes all courses offered on or off the college campus of more than a week in length and less than the four-year college course. It includes no course that has for its object securing the college degree, undergraduate or graduate.

The purpose of short-course work is to provide instruction in agriculture and related subjects for men and women who either do not possess college entrance requirements, or who, for one reason or another, are unable to take the regular four-year college course.

The objective of short-course work is very clearly defined. It is to provide such practical instruction and training as will fit men and women for Massachusetts farms and Massachusetts farm life. The development of agriculture in Massachusetts necessitates the training of larger numbers of men and women who will have had such instruction as will enable them to make the farms produce more and pay better, and to realize the opportunities offered by agriculture in the State. Many classes of men and women demand this kind of instruction. These classes vary from those who have finished the eighth grade to the college graduate, but the majority of short-course students come with a background of practical farm

experience and a certain maturity of thought and judgment arising out of life.

Through the further development of short-course work the resources of the college will be made available to a large class of students in the State in so far as they are able to profit by these resources. It is not the aim of short-course work to enter the field of secondary agricultural education or to offer instruction preparatory for college, but to provide practical courses for young men and women who feel they are too old to enter a secondary school, and for men and women of mature years and practical experience. Such students have already enrolled in the first term of our new two-year course in practical agriculture, and they always take advantage of the opportunities offered by the ten weeks' winter school.

The Demand for Short-course Work.

Provision should be made as rapidly as possible to meet the present demands for instruction from the following groups of students: —

1. A large group of young men and women who dropped out of school at the eighth grade and went to work on the farm, or who took a year or two of high school work, but who realize now the need of education in agriculture. There should be a thorough course combining both theory and practice for this group of young men and women who will come from the farm and return to the farm. Actual farm experience should be a part of this course, and credit required and allowed.
2. Graduates of county agricultural schools, for whom a short course should be provided that will supplement work of the county agricultural school.
3. Graduates of agricultural departments of high schools.
4. Graduates of high schools, who have not had agriculture and who are not eligible to the four-year college course.
5. Graduates of liberal arts colleges.
6. Adults who are not eligible to the four-year course.

Plans for the Development of Short-course Work.

The Two-year Course in Practical Agriculture, recommended by the Legislature.

The rapid development of the military situation during the summer and fall made it inadvisable to attempt more than a four months' course as the first step in the organization of a permanent, thoroughgoing, all-the-year course in practical agriculture combining both theory and practice, and open to students seventeen years of age or over. The four months' course that was authorized was open to men of sixteen, owing to the fact that eighteen-year-old men were in military service. However, the age limit will be raised to seventeen next year. The experience of the past two or three months has demonstrated that such a course will be warmly welcomed in the State, and will render a great service in the development of Massachusetts agriculture.

The Ten Weeks' Winter School.

This school, which has been established for a number of years, should be continued. There is a large demand for it. It serves more mature farmers and their wives, and has a very definite place.

A Regional School.

There has been a constant demand for a school of from four to six weeks in connection with some other educational institution located in the eastern part of the State, in or near Boston, by means of which short, practical courses in agriculture might be presented.

The Summer School.

The summer school meets a very definite need in the State. It provides instruction in agriculture for those who cannot attend at any other time.

Graduates of County Agricultural Schools, Agricultural Departments of High Schools and College Graduates.

To provide for this group of students I suggest the organization of one-year vocational courses along special lines, similar to the course in poultry now offered by the poultry department. These one-year vocational courses should be developed as rapidly as the demand for them seems to warrant. The graduate of the secondary agricultural school would thus be able to secure the particular kind of instruction that would meet his needs.

In conclusion may I say that through short-course work the college will serve from 600 to 800 students each year other than those enrolled in the regular courses. In order that the college may be able to render this service it will be necessary to make financial provision for instruction, equipment, etc.

Alumni Statistics.

During the year the secretary of the college has made a study of the occupations of the graduates of the college. The accompanying tabulation is based upon the civilian occupations of the graduates covering the period from 1871 to 1916, inclusive. Special attention is called to the fact that of the living graduates whose occupations are known over 56 per cent. are found in the classes of the eleven-year period, from 1906 to 1916; and less than 44 per cent. are found in the thirty-five year period from 1871 to 1905. The percentage of farm operators, including market gardening and floriculture, is substantially the same for the graduates of the earlier period as for the later period. It should be noted, however, that during the past eleven years

there has been a very marked increase in the percentage of graduates going into agricultural vocations, whereas of the graduates of the first thirty-five years a very large percentage went into non-agricultural vocations. Thus it appears that of the graduates of the first thirty-five years less than 53 per cent. are engaged in agricultural vocations, whereas of the graduates of the eleven-year period following that the percentage rises to above 77 per cent. Correspondingly, the percentage of graduates for the first period in non-agricultural vocations was 47 per cent., and for the second period, 23 per cent. Referring again to the fact that over half of the living graduates of the college fall in the second group, I think we find a satisfactory answer to the criticism that is sometimes made that we are not training definitely enough for the agricultural vocations.

Occupational Classification of Graduates based on Statistics of Civilian Occupations collected August, 1918.

	1871–1905.		1906–16.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Agricultural Vocations: —						
Living graduates whose occupations are known.	496	43.36	648	56.64	1,144	–
Farm operators, including market gardeners and florists.	141	28.42	186	28.70	327	28.58
Agricultural college administrators and teachers.	26	5.24	36	5.55	62	5.42
Agricultural school administrators and teachers.	3	.61	42	6.48	45	3.93
Experiment station administrators and experts.	15	3.02	16	2.47	31	2.71
Extension service administrators and experts.	10	2.01	30	4.63	40	3.50
State agricultural experts, ...	5	1.01	15	2.31	20	1.75
United States Department of Agriculture administrators and experts.	9	1.81	35	5.40	44	3.84
Landscape gardeners and foresters, . .	15	3.02	68	10.50	83	7.25
Agricultural business, ...	8	1.61	24	3.70	32	2.80
Miscellaneous agricultural experts, . .	30	6.05	51	7.87	81	7.10
Total, ...	262	52.80	503	77.62	765	66.87
Non-agricultural vocations: —						
Business, ...	75	15.12	50	7.72	125	10.92
Engineers, ...	37	7.46	26	4.01	63	5.51
Physicians, ...	35	7.06	3	.46	38	3.32
Teachers, ...	23	4.63	23	3.55	46	4.02
Miscellaneous, ...	64	12.90	43	6.64	107	9.35
Total, ...	234	47.18	145	22.39	379	33.13

Report of the Commission on the Investigation of Agricultural Education.

In January, 1918, the Commission on the Investigation of Agricultural Education, which was appointed during the summer of 1916, made its report to the General Court in a document of sixty pages, which covered in a very broad way the activities of the college and contained suggestions for improvement. The following is a digest of the main recommendations and criticisms: —

The Trustees. — The commission recommended no change in method of trustees' appointments, and said: "Happily, political considerations have not apparently influenced the appointment of trustees in the Massachusetts College."

The Faculty. — It was recommended that the faculty "should be paid adequate compensation for the services they render," and the statement was made that there was no evidence that members of our faculty were engaged in outside activities detrimental to their work.

Retirement Age and Allowance. — The commission recommended: "That all teachers or scientists of the staff be retired at the age of sixty-eight, and that persons so retiring, who have been in the service of the college at least fifteen years, should be granted retirement allowance either by the trustees or by the Teachers' Retirement Board, after suitable legislation."

Entrance Requirements. — The commission took the position that students should be as well prepared for entrance as those applying to any other college, and that the college should make its degree of equal worth to the degrees conferred by other colleges. The commission indicated a feeling that the entrance requirements had sometimes been administered a little too severely, with the effect of excluding some who were qualified to take the college course, and recommended that the methods of entrance should be broadened somewhat, with a rather more liberal policy of probation for students who technically may slightly fall below the requirements. It also recommended that more credit should be given for entrance to students who had had agriculture in county schools and in agricultural departments of high schools.

Courses of Instruction. — The commission laid down for the college the general principle that "in its distinctive field of agriculture, it should be comparable with the Massachusetts Institute of Technology in its field of the mechanic arts. No countenance whatever should be given to any suggestion that the agricultural college be placed on a level with trade or vocational schools." The commission called attention to the fact that the college is bound, by the language of the original Morrill act, under which it was organized, "to give a liberal education as an integral part of its distinctive work." In discussing the criticism that too small a proportion of the graduates of the college became practical farmers, the commission said that "the criticism is no longer merited," and further, "that the college, in comparison with other agricultural colleges, makes a distinctively favorable showing, particularly in the proportion of its graduates who have become agricultural teachers and experts in agricultural science. The college authorities should be fully assisted by the public in maintaining a high standard of instruction and in holding students to high standards of scholarship." The commission also endorsed the practice of the college of admitting students from other States.

The Graduate School. — The commission heartily commended the plan of maintaining a graduate school of high grade, and recommended ample provisions for its support.

The Experiment Station. — The commission emphasized very strongly the fundamental place of the experiment station, and recommended that the station be entirely relieved from the administration of control laws, in order to devote full time to experimental and investigational work.

The Extension Service. — The commission gave high praise to the extension service for its work in the field, but was critical of what it believed to be an apparent effort on the part of the college, through its extension service, to engage in activities that lie beyond the legitimate scope of an educational institution.

Relation to the State Board of Agriculture. — The commission endorsed the plan of division of labor and of co-operation that had already been worked out by the former State Board of Agriculture and the trustees of the college.

Board of Agricultural Co-ordination. — The commission recom-

mended that "a board of agricultural co-ordination be established by legislative action, whose duty it shall be to correlate the agricultural agencies of the Commonwealth, to supervise their respective publications, to prevent overlapping, and to secure the greatest efficiency and economy in their work."

Material Needs of the College (Financial Support). — The commission stated that "the first need of the college is permanent and adequate financial support." After discussing various methods of support, the commission said: "It is clear that it is desirable, from the point of view of the college, that its income may be so insured as to make possible the arrangement of a program of development for more than one year at a time."

The commission endorsed the principle, which has been adopted in seventeen other States, by which the Legislature "fixes in the statute a fractional or millage basis for the support of the college." Attention was called to the large amount of time and energy required each year in urging before the Legislature the needs of the college. The report also stated that, "in the event of the adoption of the State budget plan, the commission sees no sufficient reason why the Massachusetts Agricultural College should not be included in its operation." The commission stated that the accounts of the college are well conducted.

Material Needs of the College (Buildings). — Attention was called to the fact that the early buildings of the college were cheaply constructed, that they have all been outgrown and most of them worn out, and that important buildings are now imperatively needed. Special mention is made of an adequate library as being one of the greatest material needs. A strong case was made for the erection of a modern, commodious and fireproof building for chemistry. "Both to meet the vital requirements for military tactics and to provide means for the physical development of the students, the trustees should be empowered to provide a suitable gymnasium and armory." The commission recommended also that the trustees be empowered to make arrangements for a complete dormitory system, that the central heating plant be fully equipped, including a system of underground tunnels, and that the financial item for repairs be considerably enlarged. The commission believed that the quality of live stock should be improved, and

that more land should be purchased for the various purposes of the institution.

The commission presented to the General Court two plans for financial support, the first calling for a permanent annual appropriation for all purposes equivalent in amount to "twelve one-hundredths of one mill for each dollar of the total assessed valuation of real estate and tangible personal property in the Commonwealth." The alternative bill called for a five-year appropriation for all purposes, beginning in 1919 at $590,000, and increasing each year to the amount of $716,000 in 1923.

The Budget Bill. — Acting on the suggestion of the commission, that if the State adopted the budget plan the college should fall in line with it, the trustees prepared a bill which embodied the principles of the millage tax and the budget system combined. The Legislature took no action on this bill.

The commission's report represents the fullest and broadest investigation the college has ever had, and I hope that when the war emergencies are over the findings of the commission may receive adequate attention. While the commission was critical of the college in several important points, it gave a general endorsement of our main policies and an unqualified approval for much larger financial support.

The Legislative Budget.

In compliance with the new rules for submitting institutional budgets, the trustees have passed a budget covering expenses for 1919, which represents somewhat of an increase over the appropriation for 1918. Because of the fact that we are now required to estimate our expenditures on a gross rather than a net basis, it is not easy to show how the budget for 1919 compares with that of 1918.

Absence in France.

Your Board, as you will recall, has voted to give me leave of absence for one year in order that I may accept service in France with the Army Overseas Educational Commission. I wish to thank you for this opportunity to attempt a very important work, not only on behalf of our soldiers on the other side, but also on behalf of agricultural education and improve-

ment in the days after the war. Dean Lewis, who served so acceptably as acting president at a former period, will act in that capacity during my absence.

The Year in the Departments of Undergraduate Instruction.

The dean reports that, in addition to the regular work of his office in attending to the absence records, discipline, etc., a large service was rendered through the faculty advisors in the effort to keep boys in college for the entire year, rather than volunteering for some branch of the military service. When at the end of the year the students were more free to enter the service the dean spent much time in keeping in touch with the boys, supporting them with proper recommendations and assisting them in entering the military branch of their choice. The system of faculty advisers for the different classes proved for the second year to be very much worth while. The seven advisers distributed among the four classes were members of the scholarship committee, and met weekly for exchange of views and discussion of the general scholarship situation. The dean recommends that this system, because of its efficiency, be extended.

Because of the shortening of the year, elsewhere referred to, and because of the general unrest which prevailed in the student body, the opinion of the students and faculty was that the work of the last academic year was not entirely satisfactory. It was apparent, however, that a similar situation prevailed at other educational institutions, and that here the situation was difficult, if not impossible, to overcome. Moreover, certain departments were handicapped by the fact that many of its teachers had left for military service. Until the end of the last college year the only department to be entirely abandoned was forestry; in all other cases the normal work was carried on as well as could be expected under the circumstances.

The work of the department of physical education was modified to better meet the requirements of the military department as prescribed for the Reserve Officers' Training Corps. There were no intercollegiate athletics during the year, but there were substituted for the same intergroup contests in football, basketball and hockey.

In the department of agricultural education apprentice teaching has been made a part of the work for students in training for educational pursuits. Arrangements have been made with the school authorities of Amherst, Hadley and the Smith Agricultural School of Northampton for carrying out this project. Apprentice teaching has been put on a permanent basis in cooperation with the Massachusetts Department of Education, under the general supervision of the Smith-Hughes Act. During the year the department published a bulletin exemplifying the efforts in apprentice teaching.

The library has taken its place with the other libraries of the country in contributing its time and service to the carrying on of war work. Several hundred volumes have been selected from miscellaneous contributions and sent to Camp Devens and to the American Library Association Despatch Office in Boston for direct shipment to France. The librarian spent ten weeks during the summer as acting librarian of the library at Camp Johnston, Jacksonville, Fla. The brief history of the Massachusetts Agricultural College, prepared by L. B. Caswell, 1871, and the "Bibliography of the College," Part I, issued by the college in commemoration of the completion of the first fifty years of instruction (1867–1917), have been printed and are being distributed. By far the most important gift to the library during the year is the "Thurber-Woolson Collection of Botanical Manuscripts." Some time ago George C. Woolson of the class of 1871 presented to the library more than a thousand letters from prominent botanists and eminent men of science. Letters from such men as Louis Agassiz, Spencer F. Baird, Charles Downing, Amos Eaton, George Engleman, G. Browne Goode, Asa Gray, W. T. Hooker, Fred Law Olmstead, C. F. Rafinesque, C. V. Riley, C. S. Sargent, John Torrey, Edward Tuckerman and George Vasey are to be found in this collection. All of these letters, postal cards, photographs and engravings have been carefully mounted and bound in four large quarto volumes. The material given by a member of the pioneer class of the college has intrinsic value and will always be of interest, and the splendid manner of its preservation adds dignity not out of proportion to either.

The Year in the Graduate School.

The attendance at the graduate school was, owing to the war, very much below normal. There have, however, been twenty-seven members of the school since Dec. 1, 1917. Many of these were in attendance but a short time, and fully half have been regular members of the staff.

The Year in the Short Courses.

The attendance at the winter and summer schools was also greatly affected by the war, and no expansion of the short-course work was undertaken until after the close of the collegiate year. Mention has already been made of the plans for developing this work in the near future.

The Year in the Experiment Station.

The past year has been marked by the loss, owing to ill health, of the services of Director Brooks. Prof. Fred W. Morse is serving very acceptably as acting director.

The growing season has been favorable for practically all the field experiments, which are a continuation of those of past years. For the first time in the station's history wheat was made a prominent crop, and excellent yields were obtained from nine varieties secured from the western wheat States.

An investigation of growing, handling and marketing tobacco was completed by Mr. S. H. DeVault, assistant in agricultural economics, who resigned to enter the army after finishing his report. His material will be edited and prepared for publication by the department.

Diseases of the potato have required the attention of the botanical department throughout the summer, and the tobacco problem has been continued on the lines of last year. An investigation of rose canker was thoroughly made by Dr. P. J. Anderson, to the great benefit of the florists.

The inspection of feeding-stuffs and fertilizers has become of increased importance because of numerous attempts to work on to the public waste materials which are practically worthless

for their intended uses. Feeding and digestion experiments were conducted with hitherto little-used feeding-stuffs to determine their proper proportion in a ration. Much time was given, in co-operation with the State Food Administration and the Federal Fertilizer Control, to efforts to suppress the sale of worthless materials.

The European corn borer has been an especially serious problem for the entomological department. Before the active season was begun, a contract had been made with the Bureau of Entomology of the United States Department of Agriculture for co-operative work in suppressing this dangerous pest. The experiment station is to investigate the habits of the insect and possible methods for its control, while the Bureau's forces are to take charge of the survey to determine its spread and of the work of suppression. Mr. S. C. Vinal, assistant entomologist, who first discovered the presence of the insect last year, was engaged throughout the season in the study of the insect's habits, until his untimely death from influenza on September 26 ended the work of an enthusiastic, painstaking investigator.

The severe winter prevented the beginning of an experiment in cross-pollenization of peaches, by the complete destruction of peach buds throughout the region.

The microbiology department began this year a systematic study of the principles involved in preservation of fruits and vegetables by canning. The amount of work performed was limited by inability to secure the assistance needed.

This station is now apparently alone in the study of inheritance of egg-production in fowls by its department of poultry husbandry. This department is perfecting plans, in co-operation with the department of microbiology, for resumption of the suppression of bacillary white diarrhœa in chicks.

The cranberry substation succeeded in raising a maximum crop of cranberries in spite of the unusually late spring and early fall frosts.

The station has lost the services of one after another of its staff during the year without being able to replace them. It has been possible to make progress in most of the investigations, however; but as lines have been completed it has not been

practicable to begin new projects. A curtailment of the work of the station has thus been unavoidable, and its effect will probably be apparent in future publications.

The Market-Garden Field Station.

Beginning with the season of 1918, the work has been planned on definite projects. The following have been started to date: —

Limited variety tests.
Asparagus demonstration plot.
Manure economy tests.
Special celery variety test.
Seed growing.
Production of root crops.
Test of maggot control for turnips.
Test of "Natures Plant Food."
Spraying for the control of celery blight.
Tests of lettuce varieties.
Tests of spinach varieties.

All of the above projects have been carried through this first season, and results have been noteworthy. Labor conditions have prevented the proper conduct of the work; more assistance will be needed to care for the records, in order to make the work of maximum value. The sales for the year ending Nov. 30, 1918, will approximate $2,000; it is the policy to make sales a secondary consideration, but to eliminate all possible wastes and sell at wholesale in the Boston market when such sales do not interfere with tests under way.

War conditions have made it impossible to complete the building program provided for by the Legislature of 1918. It has been necessary to defer the construction of the foreman's cottage because the funds available are entirely inadequate to construct a suitable house at the present cost of materials and labor. The two greenhouses planned have been erected, but it has been decided to defer the construction of the boiler house until next year.

Two meetings of vegetable growers have been held at the market-garden field station. The first of these was a meeting of the Boston Market Gardeners; about 40 were present. The

second was a field day, on August 10; in spite of the difficult labor situation and bad weather 130 were present, including a large delegation from Worcester and Directors Hartwell and Lipmann from their respective experiment stations.

It is felt that the market-garden field station can be made a very powerful factor in interesting and benefiting the commercial vegetable growers of Massachusetts. There has been a growing interest in the work, although the year has been a difficult one in which to bring men to the station because of the labor situation. With the development of the greenhouse equipment and the better knowledge of the work, it is believed that the market-garden field station will fully measure up to expectations.

The Year in the Extension Service.

The director points out that the year just closing has been one in which there have been many difficult problems to meet, but at the same time it has been one rich in opportunity. There have been many changes in the staff, and under present conditions it is extremely difficult to fill vacancies with competent persons. New legislation in Washington supporting the work, with the attendant regulations, and the organization of the Food Administration with its large number of workers, many of whom were unacquainted with the agricultural field and the system of agricultural education which has been built up, have raised many perplexing problems. We have tried to organize our extension service so that it would at least possess the elements of elasticity and adaptability in order to meet any emergency, and we have tried to imbue all our workers with a co-operative spirit in order that the extension service may function with other legitimate institutions of a public and private nature. Under all of these and other conditions the director believes that there is reason for our feeling a good deal of satisfaction with the work done and the progress made in developing the agriculture and country life of Massachusetts during the past year.

The director returned from Washington to active duty at Amherst on April 1, and on that date Mr. Kilham was assigned as the college representative in the office of the Food Administrator in Boston.

It would seem that perhaps the most striking thing in the work this year has been the assistance which our staff has been able to render to other organizations. There has been perfect co-operation between the extension forces and those of the Food Administration. The latter has delegated to the extension forces the work of increasing production, and home conservation. The extension forces have in turn given all possible aid, consistent with their work as teachers, in helping the Food Administration in its control and regulatory work. As a result of this co-operation it has not been necessary to create new machinery to meet the demands, although at times extra workers have been added.

Several of our staff have helped the Regional Milk Commission in the work of fixing the price of milk.

Our staff has given extended courses on food work at Smith, Mount Holyoke and Simmons colleges, and at some of the normal schools. We have co-operated with a number of organizations in Boston in maintaining the demonstration work on Boston Common. Members of our staff have been lent to farm bureaus, without charge for their services, for considerable lengths of time. Courses of lectures have been given for the school committee of Boston and the Boston Chamber of Commerce. The above will serve as examples of co-operation, but by no means exhausts the amount of work carried on with other organizations.

The large volume of work this year has been made possible by emergency funds coming from Washington, and those appropriated by the Massachusetts Food Administration.

The reorganization of the farm bureaus in accordance with the act of the Legislature, making these organizations public institutions in compliance with the anti-aid amendment, has made readjustments advisable in the relationship of the Federal and State extension systems to these county organizations. On October 1 the director assumed again direct relationship with the county organizations in matters of policies, finances and general administration, and Mr. S. R. Parker on that date became State leader of agricultural projects.

We come to the close, on December 1, of the five-year period for which funds have been appropriated to the college for

extension work in this State. The increase in the scale of salaries which must now be met, the increased cost of travel, equipment and supplies, the need of making permanent some of the projects which have been supported by the State Food Administration this year, and the desirability of adding specialists in departments of work which are much called for, make additional funds necessary for 1919.

THE SCOPE OF THE COLLEGE TASK.

In my report of last year I called attention to the fact that the war had definitely and permanently enlarged the field of our service as a public institution. Not yet are all the features of this widened field clear. Just what effect this broadening of scope will have upon our investigation and our teaching and our extension work, we do not know. But we should realize that the change has come. To illustrate the character of the change, I wish to submit an outline of the food and feed supply problem prepared by Miss Lorian P. Jefferson on the basis of memoranda gathered both from our staff and from outside agencies. Unquestionably, we must deal not merely with the production of food and feeds, but also with their conservation and use. I am quite sure that in the near future we must enlarge our plans for investigation as well as for teaching, in an effort to occupy the entire field indicated in the outline, which follows this part of the report.

THE IMMEDIATE NEEDS OF THE COLLEGE.

LEGISLATIVE BUDGET, 1919.

While the country was confronted with the sole problem of prosecuting the war with all its available resources and energy, this institution adopted the policy of not pressing for legislative appropriations for large construction projects. In view of recent military developments, the early need of absorbing the labor of our returning soldiers, and the inevitable increase in our student body, especially the increase of women students, it now seems advisable not only to ask for the completion of some minor projects of long standing, but also to urge an appropriation for the proper accommodation of our women students. Accordingly, the following requests will be made of the Legislature of 1919: —

1. Women's building and equipment,		$150,000
2. Miscellaneous improvements in buildings and grounds, and teaching, operating and office equipment,		35,000
3. Market-garden field station,		15,000
Completion of greenhouses,	$4,500	
Administration building,	7,500	
Fencing farm area,	2,000	
Irrigation equipment,	1,000	
		$200,000

Following is a brief explanation of the need for the appropriations thus requested: —

Women's Building and Equipment, $150,000.

The demand for the development of this work is much more pressing than it was a year ago. Women are continuing to come to us, and many more would come if we had adequate accommodations for them. Thirteen women came in September, and I understand that 8 or 10 of the 40 students who are coming to our short course from December 1 to April 1 are women. The past year has tremendously increased the interest of women in all phases of agriculture and the food problem. With the two-year short course starting in full swing next September we shall probably have close to a hundred women students on the campus.

How we shall take care of them with our present very meager housing facilities, it is difficult to say. Already we have more women than we can satisfactorily house. One thing is certain, — we cannot turn them away; in some way we must provide for them. A new building, therefore, should be built at once. It will be impossible for us to do anything for them next autumn, because it will be at least another year before any building will be ready to accommodate them. To ask them to wait two years would be grossly unjust to the women, who are pressing to take advantage of the work that the college has to give and which the State so much needs.

In respect to this most urgent demand and the general aspects of the problem, I feel that I can do no better than to quote in part from my discussion of a year ago: —

The Massachusetts Agricultural College is the only land-grant college in New England, and I think I am correct in saying the only one in the north, that does not have special courses and provision for women. This fact is not necessarily conclusive as to our own policy; it does, however, indicate that we stand alone in the policy, and consequently must justify it if it is to be maintained.

The development of woman's interest in agriculture is rather notable. The number of women farmers in the east seems to be increasing. The organization of women interested in agriculture, started some years ago, has been fostered by the war, and has become a strong movement. The mere fact that girls are taking courses in agriculture, short and long, in rapidly increasing numbers is of utmost significance. It is worth noting that before the war European as well as British agricultural educational systems were providing increasingly for women.

The emphasis upon the importance of food thrift in this war has increased immeasurably the need of providing for the education of women in certain lines of endeavor for which there is now wholly inadequate preparation. Questions as to the use of food, the saving of food, the preserving of food — to a large extent matters in charge of women — raise nothing less than an issue.

There is a fundamental reason why an agricultural college should provide courses for women. For fifty years we have been endeavoring, through research and teaching and extension service, to enable the farmer to make more money from his farm. As already noted, many of the land-grant colleges have courses in home economics. It is doubtful, however, if any college has yet adequately provided for the training of women for rural home making in the same sense that they have attempted to train the men for farm making. But however that may be, and whatever may be the difficulties in the way of carrying out such an ideal, the

fact remains that the whole field of rural home making needs to be developed, and can be developed adequately only in the atmosphere of an agricultural college.

I believe that we should not longer delay the inauguration of this type of work. The students are coming to us, the percentage of attendance increasing very rapidly in spite of the fact that we offer no special encouragement. Moreover, this very war emergency that is reducing our attendance of men increases the call for special work for women. Particularly in relation to the food question as a practical contribution to the war, both in production and in conservation, we find the need for educational work.

I therefore recommend that we ask the Legislature this year for an appropriation of $150,000 for a dormitory building and equipment which will accommodate from 75 to 100 girls.

Miscellaneous Improvements and Equipment, $35,000.

Each year we are obliged to seek an appropriation for miscellaneous improvements in buildings and grounds, and for miscellaneous teaching, operating and office equipment. Inasmuch as our requirements are never met by the Legislature, the list of improvements and equipment presented this year is, therefore, somewhat of an accumulation of needs of long standing.

Market-garden Field Station, $15,000.

The Legislature of 1918 reduced our request for construction at the market-garden field station by $12,000. Renewing this request we are petitioning for $4,500 to complete the greenhouses, and $7,500 for the construction of an administration building, to provide offices, storage for records, a small laboratory to take care of the work which is to be done immediately on the grounds, a committee room, a dark room for photographic work, and accommodations for the heating plant for the administration and service buildings and the foreman's cottage.

In addition, we request an appropriation of $2,000 to fence the farm area at the station, and $1,000 to install necessary irrigation equipment.

Respectfully submitted,

KENYON L. BUTTERFIELD,
President.

THE FOOD AND FEED SUPPLY PROBLEM IN MASSACHUSETTS.

I. Food Requirements.
   Kinds and amounts.
   1. Grain and grain products.
   2. Meat and meat products.
   3. Dairy products.
   4. Vegetable and vegetable products.
   5. Poultry and eggs.
   6. Fruits and nuts.
   7. Sea food.

II. Food Resources.
   A. Land.
      1. Tilled.
      2. Tillable.
         a. Untilled.
         b. Reclamation of wet and arid lands.
   B. Labor.
      1. Family.
      2. Hired.
   C. Equipment.
      1. Buildings.
      2. Machinery.
   D. Fertilizers.
      1. Commercial.
         a. Kinds.
         b. Amounts.
         c. Sources.
      2. Barnyard.

III. Food Production.
   A. Present.
      1. Human food — kinds and amounts —
         a. Grown
         b. Marketed
         c. Purchased
         } in Massachusetts, New England, United States.
      2. Animal feed — kinds and amounts —
         a. Grown
         b. Marketed
         c. Purchased
         } in Massachusetts, New England, United States.

III. Food Production — *Concluded.*
- B. Economic (desirable substitutions).
  1. Kinds.
  2. Quantities.
  3. Nutritive values.
  4. Prices or costs.
- C. Suggested changes.
  1. Better farm management as to —
     - *a.* Competing crops.
     - *b.* Competing crop areas.
     - *c.* Markets.
  2. Community organization —
     - *a.* For production.
     - *b.* For farm business.
       - (1) Purchase.
       - (2) Sale.
     - *c.* For use of labor.
     - *d.* For credit.
  3. Provision for seeds, fertilizers, machinery.
  4. Insurance facilities.
  5. Credit facilities.
  6. Legislation.
     - *a.* Marketing.
     - *b.* Land transfers.
     - *c.* Leases.
     - *d.* Protection of stock, etc.

- D. Economics of production.
  1. Food *versus* feed.
  2. Live stock *versus* grain, vegetables, etc.
  3. Labor for agricultural production *versus* labor for industry.
  4. Transportation of food *versus* transportation of feed.
  5. Comparative costs, Massachusetts *versus* other sections of the United States.

IV. Food Distribution.
- A. Exports and imports.
- B. Transportation agencies.
  1. Railroads.
  2. Ship lines.
  3. Trolley lines.
  4. Trucks.
  5. Express.
  6. Parcel post.
- C. Local food movements.

IV. Food Distribution — *Concluded.*
- D. Storage.
  - 1. Farm.
  - 2. Commercial.
  - 3. Household.
- E. Standardization.
- F. Collective preparation.
- G. Bargaining.
  - 1. Individual.
  - 2. Collective.
- H. City marketing.
- I. Public markets.
- J. Prices.
  - 1. Determination.
  - 2. Publication.
- K. Prevention of waste and spoilage.
- L. Assistance in marketing.
  - 1. Marketing agents.
  - 2. Market news service.
- M. Inspection.

V. Food Conservation.
- A. Commercial.
  - 1. Manufacture.
    - *a.* Vegetable products.
    - *b.* Meat products.
    - *c.* Fish products.
    - *d.* Fruit products.
    - *e.* Culls, seconds, surplus.
    - *f.* Wastes.
  - 2. Preparation.
    - *a.* Bakeries.
    - *b.* Delicatessen.
    - *c.* Hotels and restaurants.
      - (1) Storage.
      - (2) Wastes.
        - (*a*) Variety.
        - (*b*) Servings.
- B. Home and commercial.
  - 1. Preservation.
    - *a.* Canning.
    - *b.* Drying.
    - *c.* Pickling.
    - *d.* Salting.
    - *e.* Smoking.

V. Food Conservation — *Concluded.*
- C. Home.
  - 1. Storage.
    - *a.* Cellar.
    - *b.* Pit.
    - *c.* Pantry.
  - 2. Wastes.
    - *a.* Table.
    - *b.* Market.
- D. Farm.
  - 1. Diseases.
    - *a.* Plant.
    - *b.* Animal.
  - 2. Pests.
    - *a.* Insect.
    - *b.* Weeds.
  - 3. Wastes through —
    - *a.* Rats and mice.
    - *b.* Improper curing.
    - *c.* Improper threshing.
    - *d.* Careless handling.
    - *e.* Shrinkage.
    - *f.* Garden wastes.
    - *g.* Skim milk wasted.
  - 4. Methods of control.
- E. Transportation.
  - 1. Faulty icing.
  - 2. Improper heating.
  - 3. Poor cars.
  - 4. Delays in transit.
  - 5. Overloading.
  - 6. Underloading.
  - 7. Duplication of delivery.
  - 8. Shrinkage in transit.
  - 9. Dining car service.
    - *a.* Preparation.
    - *b.* Storage.
    - *c.* Servings.

VI. Home Use of Food.
- A. Nutrition.
  - 1. Food requirements.
  - 2. Well-selected diets.
  - 3. Modified diets.

VI. Home Use of Food — *Concluded.*
- A. Nutrition — *Concluded.*
  - 4. Desirable changes.
    - *a.* Racial preferences.
    - *b.* Household.
    - *c.* Children.
  - 5. Meals for large groups.
    - *a.* Hotels and restaurants.
    - *b.* Public institutions.
    - *c.* Camps, etc.
  - 6. Diseases due to faulty diets.
- B. Standards.
  - 1. Suitability.
  - 2. Wholesomeness.
  - 3. Cleanliness.
  - 4. Purity.
  - 5. Labor involved.
  - 6. Relative cost.
- C. Marketing.
  - 1. Selection.
  - 2. Prices.
  - 3. Market news service.
- D. Storage and refrigeration.
- E. Preparation.
  - 1. Equipment.
  - 2. Cooking.
- F. Serving.
- G. Wastes.

TABLES AND STATISTICS.

Table I. — *Resignations.*

Position.	Name.
Chief clerk, extension service,	Elbert L. Arnold.
Clerk, extension service,	Ella B. Baldwin.
Instructor in zoölogy,	Stanley C. Ball.
Superintendent of the farm,	John J. Barber.[1]
Clerk, president's office,	Evelyn Brewster.
Assistant chemist, experiment station,	James P. Buckley.
Stenographer, division of rural social science,	Bertha E. Connelly.
Extension associate professor of agricultural economics,	E. Farnham Damon.
Assistant, department of agricultural economics,	Samuel H. DeVault.
Stenographer, division of agriculture,	Hazel Dewar.
Assistant professor of mathematics,	Charles R. Duncan.
Stenographer, extension service,	Margaret L. Evens.
Associate professor of beekeeping,	Burton N. Gates.
Field agent,	Charles H. Gould.
Clerk, treasurer's office,	Marion E. Kelsey.
Mailing clerk, extension service,	Clarence A. Kendall.
Clerk, department of poultry husbandry,	Rachael G. Leslie.
Resident nurse,	Florence Levensaler.
Extension assistant professor of poultry husbandry,	Alfred G. Lunn.
Clerk, department of poultry husbandry,	Grace E. MacMullen.
Clerk, department of poultry husbandry,	Elizabeth E. Mooney.
Library assistant,	Marion E. Norton.
Clerk, treasurer's office,	Clara Parker.
Assistant chemist, experiment station,	Bernard L. Peables.
Clerk, department of floriculture,	Helen C. Pomeroy.
Extension assistant professor of home economics,	Marie Sayles.
Extension assistant in home economics,	Mrs. F. A. C. Smith.
Supervisor of short courses and assistant professor of market gardening.	Andrew S. Thomson.
Clerk, farm management, extension service,	Flora E. Torrey.
Library assistant,	Ethel M. Turner.
Assistant in entomology, experiment station,	Stuart C. Vinal.[2]
First clerk, division of agriculture,	Aurelia B. Wentworth.
Chief clerk, extension service,	Burton C. Whidden.
Instructor in agricultural economics,	Otto F. Wilkinson.

[1] Died of pneumonia Oct. 3, 1918, at Amherst.
[2] Died of pneumonia Sept. 26, 1918, at Arlington, Mass.

Table II. — *New Appointments.*

A. In the Academic Departments.

Position.	Name.	Institution from which graduated and Degrees.
Instructor in poultry husbandry,	Luther Banta,	B.Sc., Cornell University, 1915.
Assistant professor of agronomy,	Herbert P. Cooper,	B.Sc., Clemson College, 1911; M.Sc., University of Wisconsin, 1916.
Associate professor of market gardening.	Arthur L. Dacy,	B.Sc., Massachusetts Agricultural College, 1902.
Supervisor of agricultural courses for women.	Margaret Hamlin,	B. A. Smith College, 1904.
Assistant professor of mathematics,	Frank C. Moore,	A.B., Dartmouth College, 1902.
Instructor in agricultural economics,	Donald W. Sawtelle,	B.Sc., University of Maine, 1913; M.Sc., University of Wisconsin, 1915.
Professor of home economics,	Edna M. Skinner,[1]	B.Sc., Columbia University, 1908.

B. In the Experiment Station.

Assistant chemist,	Esther S. Mixer,	B.A., Mount Holyoke, 1918.
Assistant chemist,	Harold B. Pierce,	B.Sc., Massachusetts Agricultural College, 1917.

C. In the Extension Service.

Garden supervisor,	Henry R. Francis,	B.Sc., Massachusetts Agricultural College, 1910.
Assistant supervisor, junior extension.	William F. Howe,	North Adams Normal School.
Assistant to director,	Daniel J. Lewis,	B.Sc., Massachusetts Agricultural College, 1915.
Assistant professor of poultry husbandry.	William C. Monahan,	B.Sc., University of Maine, 1914.
Assistant director,	Ralph W. Redman,	B.Sc., University of Maine, 1912.
Professor of farm management demonstration.	Benjamin G. Southwick,	B.Sc., Massachusetts Agricultural College, 1912.
Extension instructor in home economics.	Mrs. F. A. C. Smith,	– – –
Extension instructor in market gardening.	Harold D. Phelps,	B.Sc., Massachusetts Agricultural College, 1909.

D. Miscellaneous.

Resident nurse,	Elizabeth Olmstead,	– – –

[1] To take effect Jan. 1, 1919.

Table II. *New Appointments* — Concluded.

E. In the Clerical Staff.

Position.	Name.
Clerk, treasurer's office,	Ruth Brooks.
Mailing clerk, extension service,	Cassie L. Clark.
Library assistant,	Lois Clark.
Clerk, president's office,	Ruth Clow.
Clerk, department of floriculture,	Viola Damon.
Library assistant,	Louise J. Delano.
Clerk, extension service,	Katharine Gardner.
Clerk, department of poultry husbandry, experiment station,	Nettie A. Gilmore.
Stenographer, division of rural social science,	Amy L. Hamilton.
Stenographer, department of entomology,	Elizabeth M. Kiley.
Chief clerk, extension service,	Carleton B. Livermore.
Clerk, treasurer's office,	Helen A. Martin.
Clerk, treasurer's office,	Clara Parker.
Clerk, extension service,	Helen A. Phillips.
Clerk, poultry department,	Ruby Sanborn.
Clerk, division of agriculture,	Marjorie Sullivan.
Clerk, extension service,	Aline B. Surprenant.
Stenographer, extension service,	Clara Swift.
Stenographer, department of poultry husbandry,	Doris Tower.
First clerk, division of agriculture,	Marion Warner.
Chief clerk, extension service,	Burton C. Whidden.

Table III. — Changes in Title and Transfers.

Changes in Title of Officers of the Institution.

Name.	Former Title.	Present Title.
Orville A. Jamison,	Assistant professor of dairying,	Associate professor of dairying.
Lorian P. Jefferson,	Research secretary, division of rural social science.	Assistant professor, division of rural social science.
Loyal F. Payne,	Assistant professor of poultry husbandry.	Associate professor of poultry husbandry.
Byron E. Pontius,	Assistant professor of animal husbandry.	Associate professor of animal husbandry.
William S. Regan,	Instructor in entomology,	Associate professor of entomology.
Harold E. Robbins,	Assistant professor of physics,	Associate professor of physics.
Ellen L. Welch,	Stenographer, department of botany.	Clerk, department of botany.
William P. Brooks,	Director of the experiment station.	Consulting agriculturist, experiment station.
John Phelan,	Professor of rural sociology,	Director of short courses and professor of rural sociology.
Walter W. Chenoweth,	Associate professor of pomology,	Professor of horticultural manufactures.
Margaret Gaskell,	Stenographer, Registrar's office,	Clerk, Registrar office.

Transfers.

Earl Jones, from instruction staff to extension service staff as extension associate professor of agronomy, July 1, 1918.

Viola Damon, stenographer, extension service, to clerk, division of horticulture, Oct. 1, 1918.

Edith Robinson, clerk, department of beekeeping, to clerk, president's office, Oct. 1, 1918.

Hazel Parker, stenographer, extension service, to stenographer, dean's office, September, 1918.

Table IV. — *Leaves of Absence.*

Miscellaneous Service.

Position.	Name.	Cause of Leave.
Professor of chemistry,	Ernest Anderson,	Service at Transvaal University.
Director of experiment station,	William P. Brooks,	Ill-health, March 1 to Sept. 31, 1918.
Professor of forestry,	William D. Clark,	Service with New England Fuel Administrator.
Professor of dairying,	William P. B. Lockwood,	Sabbatical leave. July 1, 1918, to Aug. 31, 1919.
Assistant professor of mathematics,	William L. Machmer,	Service with United States Department of Agriculture.
Research pomologist,	Jacob K. Shaw,	Sabbatical leave. Sept. 1, 1918, to Feb. 28, 1919.

War Service.

Position.	Name.
Assistant chemist, experiment station,	Windom A. Allen.
Extension assistant professor of farm demonstration,	Wesley H. Bronson.
President of the college,[1]	Kenyon L. Butterfield.
Assistant in physical education,	Llewelyn L. Derby.
Instructor in dairying,	Harry D. Drain.
Associate professor of animal pathology,	George E. Gage.
Assistant professor of physical education,	Harold M. Gore.
Instructor in mathematics,	Burt A. Hazeltine.
Assistant professor of floriculture,	August G. Hecht.
Extension instructor in charge of poultry club work,	Roswell W. Henninger.
Professor of physical education and hygiene,	Curry S. Hicks.
Instructor in microbiology,	Egerton G. Hood.
Extension assistant professor of pomology,	Austin D. Kilham.
Assistant in veterinary science, experiment station,	John B. Lentz.
Instructor in English,	Frank P. Rand.
Assistant chemist, experiment station,	Robert S. Scull.
Assistant chemist, experiment station,	John B. Smith.
Extension assistant professor of landscape gardening,	Frank A. C. Smith.
Instructor in poultry husbandry,	Lloyd L. Stewart.
Extension instructor in pomology,	Ralph E. Van Meter.
Head of division of horticulture and professor of landscape gardening,	Frank A. Waugh.

[1] From Dec. 1, 1918.

TABLE V. — *Speakers for the Year.*

A. Speakers for Wednesday Assembly for Year ending Nov. 30, 1918.

1917.

Dec. 5. — Dean Edward M. Lewis, M. A. C.
Dec. 19. — Prof. Frank A. Waugh, M. A. C.

1918.

Jan. 2. — Prof. Edgar L. Ashley, M. A. C.
Jan. 9. — Prof. Raymond G. Gettell, Amherst College.
Jan. 16. — Pres. Kenyon L. Butterfield, M. A. C.
Jan. 30. — Student forum.
Feb. 6. — Mr. C. H. Brewer, New York City.
Feb. 13. — Mr. Philip W. Ayres, Boston, Mass.
Feb. 27. — Prof. E. F. Humphreys, Trinity College, Hartford, Conn.
Mar. 6. — Prof. Charles H. Patterson, M. A. C.
Mar. 13. — Student forum.
Mar. 20. — Prof. A. A. Mackimmie, M. A. C.
Mar. 27. — Rev. James D. Taylor, Amherst, Mass.
Apr. 3. — Hon. Frank A. Pope, Boston, Mass.
Apr. 10. — Rev. J. Franklin Babb, Haverhill, Mass.
Apr. 17. — Pres. Kenyon L. Butterfield, M. A. C.
Oct. 30. — Pres. Kenyon L. Butterfield, M. A. C.
Nov. 6. — Mr. S. K. Ratcliffe, London, Eng.
Nov. 13. — Mr. Edwin R. Embree, New York City.
Nov. 20. — Mr. Leonard G. Robinson, Springfield, Mass.

B. Speakers at Sunday Chapel, Oct. 14, 1917, to Nov. 30, 1918.

1917.

Oct. 14. — Pres. Kenyon L. Butterfield, M. A. C.
Nov. 4. — Mr. Wellington H. Tinker, New York City.
Nov. 11. — Rev. Louis C. Cornish, Boston, Mass.
Nov. 18. — Dean William Wallace Fenn, Cambridge, Mass.
Nov. 25. — Dr. A. B. Benson, Yale University, New Haven, Conn.
Dec. 2. — Rev. Frank L. Goodspeed, Amherst, Mass.
Dec. 9. — Pres. John M. Thomas, Middlebury College, Middlebury, Vt.

1918.

Jan. 6. — Rabbi Louis L. Mann, New Haven, Conn.
Jan. 13. — Prin. Alfred E. Stearns, Andover, Mass.
Jan. 20. — Rev. John H. Holmes, New York City.
Jan. 27. — Rev. Judson L. Cross, Fitchburg, Mass.
Feb. 3. — Rev. Niel McPherson, Springfield, Mass.
Feb. 10. — Dean Charles R. Brown, New Haven, Conn.
Feb. 17. — Rev. Houghton Schumacher, Hingham, Mass.
Mar. 3. — Mr. Bruce Barton, New York City.
Mar. 10. — Prof. Albert P. Fitch, Amherst, Mass.
Mar. 17. — Rev. Herbert A. Jump, Manchester, N. H.
Mar. 24. — Rev. A. H. Wheelock, Needham, Mass.
Mar. 31. — Rev. William E. Strong, Boston, Mass.
Apr. 7. — Rev. J. Edgar Park, Newton, Mass.
Apr. 14. — Rev. Arthur H. Bradford, Rutland, Vt.
Nov. 3. — Rev. S. Paul Jefferson, Amherst, Mass.
Nov. 10. — Rev. William Horace Day, Bridgeport, Conn.
Nov. 17. — Rev. D. Brewer Eddy, Boston, Mass.
Nov. 24. — Rev. Herbert J. White, Hartford, Conn.

Table VI. — *Attendance.*

A. In Work of College Grade.

	Registration Nov. 30, 1917.	Registration Nov. 30, 1918.			
		S. A. T. C.	Regular.		Total.
			Men.	Women.	
Senior class,	64	20	22	10	52
Junior class,	113	47	14	3	64
Sophomore class,	117	66	7	6	79
Freshman class,	108	79	30	5	114
Probationary freshmen,	10	–	–	–	–
	412	212	73	24	309
Graduate students,	29	–	7	3	10
Unclassified students,	50	151	14	5	170
Vocational poultry students,	5	–	–	–	–
Special students,	4	–	–	–	–
	500	363	94	32	489

B. Short-course Enrollment and Convention Registration.

	1917.	1918.
Winter school,	110	90
Farmers' week,	800	632
Beekeepers' school,	50	–
Polish farmers' day,	300	12
County agents' conference,	120	150
Summer school of agriculture and country life,	90	68
Conference on rural organization,	121	–
School for rural social service,	20	–
Ministers' conference,	8	–
Poultry convention,	176	200
Boys' camps,	102	17
Girls' camp,	17	24
	1,914	1,193

TABLE VII. — *Legislative Budget, 1918.*

ITEMS.	Amount asked.	Amount granted.
Improvements at the power plant, including coal-handling apparatus, turbine house and equipment, and residence for engineer.	$59,700	$54,500
Improvements at dining hall,	12,000	12,000
Poultry buildings,	7,500	–
Potting shed and bulb cellar at greenhouses,	6,659	–
Miscellaneous improvements in buildings and grounds,	30,306	20,000
Miscellaneous teaching, operating and office equipment,	20,680	
	$136,845	$86,500
Buildings, equipment and maintenance of market-garden field station at Lexington: —		
Greenhouses and heating plant,	$13,500	$9,000
Foreman's cottage,	4,500	4,500
Administration building,	7,500	–
Maintenance,	3,000	3,000
	$28,500	$16,500

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1918.*

A. Home Addresses of Students (classified by Towns and Cities).

Abington, 1	Hingham, 1	QUINCY, 1
Amesbury, 1	HOLYOKE, 1	Reading, 1
Amherst, 9	Ipswich, 1	REVERE, 1
Arlington, 4	LAWRENCE, 1	Sherborn, 1
Belchertown, 3	Lenox, 1	Shelburne, 3
BOSTON, 6	LYNN, 3	SOMERVILLE, 1
Brattleboro, Vt., 1	MALDEN, 1	Southbridge, 1
Brookline, 3	Mansfield, 1	SPRINGFIELD, 5
BROOKLYN, N. Y., 1	Maplewood, N. J., 1	Stafford Springs, Conn., 1
Chelmsford, 1	Maynard, 1	Stockbridge, 1
CHELSEA, 1	Medfield, 1	Stoughton, 1
CHICOPEE, 1	MEDFORD, 2	Stow, 1
China, 2	Methuen, 1	Sudbury, 1
Deerfield, 1	Middlebury, Conn., 1	Sunderland, 1
Dudley, 1	Montague, 1	Tarrytown, N. Y., 2
Easthampton, 1	NEW BEDFORD, 1	WATERBURY, CONN., 1
East Greenwich, R. I., 1	NEWTON, 4	Wenham, 1
FALL RIVER, 1	NEW YORK CITY, N. Y., 3	Westfield, 1
Falmouth, 1	NORTHAMPTON, 1	Weymouth, 1
Glastonbury, Conn., 2	NORTH ADAMS, 2	Williamstown, 1
Greenfield, 1	Northbridge, 1	WOBURN, 1
Hardwick, 1	Orange, 2	WORCESTER, 6
HAVERHILL, 3	PASSAIC, N. J., 1	

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1918* — Continued.

B. Home Addresses (classified by States).

	Number.	Per Cent.		Number.	Per Cent.
Connecticut,	5	4.38	New York,	6	5.26
China,	2	1.75	Rhode Island,	1	.88
Massachusetts,	97	85.09	Vermont,	1	.88
New Jersey,	2	1.75		114	99.99

C. Home Addresses (classified by Counties of Massachusetts).

	Number.	Per Cent.		Number.	Per Cent.
Barnstable,	1	1.03	Middlesex,	19	19.59
Berkshire,	5	5.15	Norfolk,	7	7.22
Bristol,	3	3.09	Plymouth,	2	2.06
Essex,	11	11.34	Suffolk,	8	8.25
Franklin,	9	9.28	Worcester,	10	10.30
Hampden,	8	8.25		97	99.99
Hampshire,	14	14.43			

D. Nativity of Parents.

	Number.	Per Cent.
Neither parent foreign born,	80	70.18
Both parents foreign born,	18	15.79
Father (only) foreign born,	3	2.63
Mother (only) foreign born,	13	11.40
	114	100.00

E. Education of Father.

	Number.	Per Cent.
Common school,	49	42.98
High school,	22	19.29
Business school,	18	15.79
College or university,	18	15.79
No statistics,	7	6.14
	114	99.99

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1918* — Continued.

F. Religious Census.

	Membership.		Preference.		Totals.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist,	11	9.65	3	2.63	14	12.28
Catholic,	11	9.65	1	.88	12	10.53
Congregationalist,	32	28.07	16	14.03	48	42.10
Episcopal,	5	4.04	3	2.63	8	7.02
Hebrew,	1	.88	3	2.63	4	3.51
Methodist,	8	7.02	–	–	8	7.02
Unitarian,	3	2.63	1	.88	4	3.51
Universalist,	1	.88	2	1.75	3	2.63
Miscellaneous,	7	6.14	2	1.75	9	7.90
No statistics,	–	–	–	–	4	3.51
	79	68.96	31	27.18	114	100.01

G. Occupation of Father.

	Number.	Per Cent.
Agriculture and horticulture,	26	22.81
Artisans,	25	21.92
Business,	30	26.31
Deceased or no statistics,	8	7.01
Miscellaneous,	10	8.77
Professional,	15	13.16
	114	99.98

H. Intended Vocation of Student.

	Number.	Per Cent.
Agriculture or horticulture (practical),	55	48.24
Agriculture or horticulture (professional),	31	27.19
Miscellaneous,	2	1.75
Undecided or no statistics,	26	22.81
	114	99.99

TABLE VIII. — *Statistics of Freshmen entering Massachusetts Agricultural College, October, 1918* — Concluded.

I. Farm Experience.

	Number.	Per Cent.
Brought up on a farm,	26	22.81
Not brought up on a farm and having had no or practically no farm experience.	34	29.82
Not brought up on a farm but having had some farm experience,	54	47.37
	114	100.00

J. Miscellaneous Statistics.

Average age, ... 18.84 years.

TABLE IX. — *Cases treated at the Infirmary, Dec. 1, 1917, to Nov. 30, 1918.*

	Daily Count.	Individual.
Dec. 1, 1917, to Jan. 1, 1918: —		
House cases,	7	1
Out-patients,	22	15
January 1 to February 1: —		
House cases,	67	9
Out-patients,	77	60
February 1 to March 1: —		
House cases,	131	24
Out-patients,	84	62
March 1 to April 1: —		
House cases,	99	23
Out-patients,	165	106
April 1 to May 1: —		
House cases,	39	9
Out-patients,	36	20
September 25 to October 1: —		
House cases,	35	8
Out-patients,	10	6
October 1 to November 1: —		
House cases,	182	29
Out-patients,	135	76
November 1 to December 1: —		
House cases (at infirmary),	162	38
House cases (at Draper Hall Hospital),	58	15
Out-patients,	233	135

Number of house cases,	780	
Number of out-patients,	762	
Total,		1,542
Number cared for in the house,	156	
Number cared for as out-patients,	480	
Total,		636

Report of the Treasurer

For the Fiscal Year ending Nov. 30, 1918.

Balance Sheet.

		Dr.	Cr.
1917.			
Dec. 1.	To balance on hand,	$23,311 52[1]	
1918.			
Nov. 30.	To receipts for fiscal year,	705,491 67	
	Expenditures for fiscal year,		$695,059 52
	Balance on hand,		33,743 67
		$728,803 19	$728,803 19

[1] Balance increased $550 on account of an overdraft on land purchased in last fiscal year.

Schedule A. — Income.

	Income.	Totals.
Income from students and others,		$117,450 53
Tuition,	$1,965 75	
Laboratory fees,	3,899 63	
Rents,	4,789 26	
Department sales,	97,340 62	
Department transfers,	3,959 30	
Miscellaneous,	5,495 97	
Income from grants by nation and State: —		
State aid,		459,648 51
Income from endowment,	3,313 32	
Appropriation for current expenses,	272,000 00	
Administration, $39,000 00		
Maintenance, 110,000 00		
Instruction, 115,000 00		
Graduate school, 3,000 00		
Additional land, 5,000 00		
Appropriation for extension service,	50,000 00	
Appropriation for experiment station,	46,000 00	
Maintenance, $40,000 00		
Feed law, 6,000 00		
Receipts from special appropriation,	88,335 19	
Federal aid,		89,669 81
Income from land grant of 1862,	7,300 00	
Income from Hatch fund of 1887,	15,000 00	
Income from Morrill fund of 1890,	16,666 66	
Income from Adams fund of 1906,	15,000 00	
Income from Nelson fund of 1907,	16,666 67	
Income from Smith-Lever fund of 1914,	19,036 48	
Income from other sources: —		
Income from experiment station,		35,124 23
Fertilizer receipts,	7,007 50	
Agricultural receipts,	6,064 36	
Cranberry receipts,	6,220 20	
Chemical receipts,	13,423 39	
Miscellaneous receipts,	2,408 78	

SCHEDULE A. — INCOME — *Concluded.*

	Income.	Totals.
Income from other sources — *concluded.*		
Income from extension service,		$3,598 59
Winter school,	$477 00	
Summer school,	697 12	
Correspondence courses receipts,	394 25	
Exhibits,	282 50	
Civic improvements,	156 09	
Miscellaneous receipts,	1,591 63	
Totals,	$705,491 67	$705,491 67

Classification of Income from Students and Others.

	Laboratory Fees.	Department Sales.	Transfers.	Rent.	Miscellaneous.	Tuition.	Totals.
Agronomy,	$195 00	–	$4 12	–	–	–	$199 12
Animal husbandry,	139 50	–	–	–	–	–	139 50
Beekeeping,	–	$584 89	–	–	$3 23	–	588 12
Botany,	320 50	–	–	–	–	–	320 50
Chemistry,	1,536 00	–	3 55	–	6 37	–	1,545 92
Dairying,	111 50	26,367 69	–	–	–	–	26,479 19
Entomology,	21 00	–	4 90	–	–	–	25 90
Farm management,	123 25	–	10 25	–	5 06	–	138 56
Floriculture,	114 00	2,293 98	–	–	–	–	2,407 98
Farm,	–	40,267 80	1,720 76	–	–	–	41,988 56
Forestry,	–	–	–	–	7 00	–	7 00
Freshman agriculture,	234 00	–	4 55	–	–	–	238 55
General agriculture,	–	–	–	–	75	–	75
General horticulture,	–	–	2,154 36	–	517 51	–	2,671 87
Grounds,	–	–	2 00	–	90 24	–	92 24
Horticulture manufacturing,	–	374 33	–	–	–	–	374 33
Hospital,	–	–	–	–	280 32	–	280 32
Landscape gardening,	142 00	–	15 71	–	–	–	157 71

CLASSIFICATION OF INCOME FROM STUDENTS AND OTHERS — *Concluded.*

	Laboratory Fees.	Department Sales.	Transfers.	Rent.	Miscellaneous.	Tuition.	Totals.
Language and literature,	$112 00	–	–	–	–	–	$112 00
Library,	–	$474 07	$6 00	–	–	–	480 07
Market gardening,	73 00	3,350 29	–	–	–	–	3,423 29
Market-garden field station,	–	2,317 46	–	–	–	–	2,317 46
Mathematics,	38 00	–	22 10	–	–	–	60 10
Microbiology,	190 00	–	–	–	$244 45	–	434 45
Military,	–	–	–	–	89 41	–	89 41
Miscellaneous,	–	–	–	–	676 81	–	676 81
Mount Toby,	–	357 00	–	–	–	–	357 00
Physics,	–	–	–	$46 00	30 00	–	76 00
Pomology,	71 00	2,564 05	–	–	–	–	2,635 05
Poultry husbandry,	102 50	16,346 55	–	–	–	–	16,449 05
Rural engineering,	191 00	–	–	–	–	–	191 00
Veterinary,	10 00	–	5 00	–	5 12	–	20 12
War emergency,	–	2,042 51	–	–	–	–	2,042 51
Women's dormitories,	–	–	–	542 00	–	–	542 00
Zoölogy and geology,	175 38	–	–	–	–	–	175 38
Operating and maintenance,	–	–	–	119 25	3,461 36	$1,965 75	5,546 36
North dormitory,	–	–	–	1,391 40	–	–	1,391 40

South dormitory,	–	–	–	1,339 00	–	–	1,339 00
College residences,	–	–	–	487 06	–	–	487 06
Dean's office,	–	–	–	–	43 43	–	43 43
President's office,	–	–	6 00	–	20 00	–	26 00
Executive order,	–	–	–	–	14 91	–	14 91
Draper Hall,	–	–	–	864 55	–	–	864 55
Totals,	$3,899 63	$97,340 62	$3,959 30	$4,789 26	$5,495 97	$1,965 75	$117,450 53

Schedule B. — Expenditures for Fiscal Year.

	Items.	Totals.
College expenses,		$432,516 87
Administration,	$38,597 06	
Maintenance,	252,825 75	
Instruction,	141,094 06	
Experiment station,		108,171 07
Administration,	888 49	
Feed inspection,	6,925 28	
Fertilizer law,	9,519 67	
Salaries,	47,123 30	
Department,	43,714 33	
Extension service,[1]		73,243 56
Salaries,	44,467 73	
Travel,	12,947 46	
Departments,	15,828 37	
Special appropriation,		81,128 02
1917, improvements and equipment,	17,568 40	
1917, market-garden field station,	5,660 57	
1917, power plant improvements,	29,531 07	
1918, improvements and equipment,	8,048 18	
1918, power plant improvements,	4,802 26	
1918, market-garden field station,	5,833 48	
1918, dining hall improvements,	9,502 54	
S. A. T. C. plumbing,	181 52	
Totals,	$695,059 52	$695,059 52

[1] Made up from State extension service and Smith-Lever funds.

Analysis of College Expenditures.

Administration.	Office Expense.	Salaries and Labor.	Travel.	Minor Equipment.	Building Supplies.	Publicity and Lectures.	Student Activity.	Commencement.	Miscellaneous.	Totals.
Dean's office,	$228 98	$149 23	–	$10 19	–	–	–	–	–	$388 40
Executive order,	–	–	$1,511 96	–	–	$1,209 13	$195 00	$361 15	$2,371 83	5,649 07
President's office,	1,390 14	188 14	28 61	20 00	$0 33	–	–	–	201 42	1,828 64
Registrar's office,	477 94	54 96	39 01	20 35	–	–	–	–	–	592 26
Treasurer's office,	653 43	196 92	138 23	53 13	26 27	–	–	–	116 62	1,184 60
Administration (salaries),	–	28,954 09	–	–	–	–	–	–	–	28,954 09
Totals,	$2,750 49	$29,543 34	$1,717 81	$103 67	$26 60	$1,209 13	$195 00	$361 15	$2,689 87	$38,597 06

Maintenance.	Office Supplies.	Labor.	Laboratory Supplies.	Refunds.	Minor Equipment.	Building Supplies.	Travel.	General Expense.	Miscellaneous.	Salaries.	Totals.
Academic maintenance: —											
Agricultural economics,	$102 46	$26 45	$8 53	–	$108 72	$1 56	$14 83	–	–	–	$262 55
Agricultural education,	142 21	8 63	70 18	–	36 04	–	66 61	–	–	–	323 67
Agronomy,	133 84	187 67	284 90	$1 50	134 37	–	30 55	–	–	–	772 83
Animal husbandry,	85 33	65 79	28 27	1 50	1 46	–	194 15	–	–	–	376 50
Beekeeping,	94 05	716 40	106 00	–	49 51	58 84	72	–	–	–	1,025 52
Botany,	235 53	494 90	487 02	6 50	–	124 95	28 29	–	–	–	1,377 19
Chemistry,	94 84	974 30	1,945 68	18 25	27 75	32 36	–	–	–	–	3,093 18
Dairying,	127 67	3,411 31	27,925 33	–	133 08	122 27	101 70	–	–	–	31,821 36
Economics and sociology,	16 66	–	9 05	–	48 94	–	–	–	–	–	74 65
Entomology,	56 22	238 60	61 70	2 00	–	34 56	–	–	–	–	393 08
Farm management,	178 60	76 75	24 59	1 75	7 87	–	60 05	–	–	–	349 61
Floriculture,	97 25	4,616 54	977 88	–	75 99	60 02	45 60	–	–	–	5,873 28
Forestry,	20 63	62 65	23 55	–	–	–	13 98	–	–	–	120 81
Freshman agriculture,	–	16 83	68 71	3 00	–	–	–	–	–	–	88 54
General agriculture,	–	1,282 81	–	–	32 14	210 73	–	–	$12 33	–	1,538 01

Analysis of College Expenditures—*Concluded.*

Maintenance.	Office Supplies.	Labor.	Laboratory Supplies.	Refunds.	Minor Equipment.	Building Supplies.	Travel.	General Expense.	Miscellaneous.	Salaries.	Totals.
Horticulture manufacturing,	$112 64	$638 70	$671 17	–	$431 70	$29 74	$9 68	–	–	–	$1,893 63
Hospital,	–	767 71	–	–	80 88	–	–	$717 02	–	–	1,565 61
Landscape gardening,	3 80	–	174 73	–	–	–	–	–	–	–	178 53
Language and literature,	22 40	30 48	135 87	$6 00	184 80	–	3 18	–	–	–	382 73
Market gardening,	81 40	3,667 85	1,076 60	4 00	5 30	43 09	159 75	–	–	–	5,037 99
Market-garden field station,	–	214 00	–	–	352 23	–	–	–	$555 71	–	1,121 94
Mathematics,	45 07	48 30	52 23	2 00	–	3 61	–	–	–	–	151 21
Microbiology,	78 02	399 58	96 42	42 20	184 84	35 48	–	–	–	–	836 54
Military science,	181 81	562 53	3 95	–	53 04	141 22	–	60 94	–	–	1,003 49
Mount Toby,	–	6,961 69	–	–	41 93	–	–	–	136 19	–	7,139 81
Physical education,	7 47	122 40	191 18	–	–	16 71	114 88	–	–	–	452 64
Physics,	42 59	220 85	179 92	–	71 34	31 60	10 30	–	–	–	556 60
Pomology,	150 42	2,805 28	339 35	2 00	34 88	–	8 71	–	–	–	3,340 64
Poultry husbandry,	535 41	3,319 14	12,787 10	10 00	84 97	32 30	43 72	–	–	–	16,812 64
Rural engineering,	38 89	52 00	248 64	4 50	167 24	23 63	9 57	–	–	–	544 47
Rural sociology,	65 06	8 12	1 50	–	–	3 49	23 70	–	–	–	101 87
Veterinary science,	17 97	223 70	641 74	–	–	37 13	–	–	–	–	920 54
War emergency,	–	1,343 18	–	–	–	–	–	553 47	339 63	–	2,236 28
Women's dormitories,	–	385 65	–	–	–	–	–	–	339 06	–	724 71
Zoölogy and geology,	24 26	52 66	99 56	15 50	36 98	1 25	13 34	–	–	–	243 55
1917 celebration,	60 70	–	–	–	–	–	–	–	1,691 24	–	1,751 94
General maintenance: —											
Farm,	–	–	–	–	–	–	–	47,778 65	–	–	47,778 65
General horticulture,	128 30	5,054 66	136 46	–	85 35	–	–	1,960 03	962 01	–	8,326 81
Graduate school,	82 57	–	–	–	–	–	–	–	–	–	82 57
Grounds,	–	4,635 92	–	–	57 00	–	–	–	88 07	–	4,780 99
Land,	–	–	–	–	–	–	–	5,000 00	–	–	5,000 00
Library,	555 02	634 63	–	–	48 82	–	54 99	4,945 36	–	–	6,238 82
Operating and maintenance,	–	–	–	–	–	–	–	86,129 77	–	–	86,129 77
Totals,	$3,619 09	$44,328 66	$48,857 81	$120 70	$2,577 17	$1,044 54	$1,008 30	$147,145 24	$4,124 24	–	$252,825 75
Instruction (salaries),	–	–	–	–	–	–	–	–	–	$141,094 06	$141,094 06
Grand totals,	–	–	–	–	–	–	–	–	–	–	$432,516 87

Current Accounts.

Disbursements and Receipts.

Accounts.	Disbursements from Nov. 30, 1917, to Nov. 30, 1918.	Receipts from Nov. 30, 1917, to Nov. 30, 1918.	Apportionment for Year ending Nov. 30, 1918.	Balance to Credit.
Administration: —				
Dean's office,	$388 40	$43 43	$500 00	$155 03
Executive order,	5,649 07	14 91	6,200 00	565 84
President's office,	1,828 64	26 00	1,500 00	—302 64
Registrar's office,	592 26	–	600 00	7 74
Salaries,	28,954 09	–	28,000 00	—954 09
Treasurer's office,	1,184 60	–	1,200 00	15 40
State Treasurer,	–	39,000 00	–	–
Maintenance, academic: —				
Agricultural economics,	262 55	–	300 00	37 45
Agricultural education,	323 67	–	285 00	—38 67
Agronomy,	772 83	199 12	350 00	—223 81
Animal husbandry	376 50	139 50	425 00	188 00
Beekeeping,	1,025 52	588 12	1,400 00	962 60
Botany,	1,377 19	320 50	1,000 00	—56 69
Chemistry,	3,093 18	1,545 92	2,350 00	802 74
Dairying,	31,821 36	26,479 19	6,200 00	857 83
Economics and sociology,	74 65	–	50 00	—24 65
Entomology,	393 08	25 90	475 00	107 82
Farm management,	349 61	138 56	300 00	88 95
Floriculture,	5,873 28	2,407 98	2,875 00	—590 30
Forestry,	120 81	7 00	150 00	36 19
Freshman agriculture,	88 54	238 55	94 46[1]	244 47
General agriculture,	1,538 01	75	1,600 00	62 74
Horticultural manufacturing,	1,893 63	374 33	1,450 00	—69 30
Hospital,	1,565 61	280 32	1,200 00	—85 29
Landscape gardening,	178 53	157 71	190 00	169 18
Language and literature,	382 73	112 00	150 00	—120 73
Market gardening,	5,037 99	3,423 29	1,450 00	—164 70
Market-garden field station,	1,121 94	2,317 46	–	1,195 52
Mathematics,	151 21	60 10	100 00	8 89
Microbiology,	836 54	434 45	900 00	497 91
Military science,	1,003 49	89 41	1,600 00	685 92
Mount Toby,	7,139 81	357 00	500 00	—6,282 81
Physical education,	452 64	–	450 00	—2 64
Physics,	556 60	76 00	560 00	79 40
Pomology,	3,340 64	2,635 05	1,275 00	569 41
Poultry husbandry,	16,812 64	16,449 05	3,100 00	2,736 41
Rural engineering,	544 47	191 00	275 00	—78 47
Rural sociology,	101 87	–	150 00	48 13
Veterinary,	920 54	20 12	1,100 00	199 58
War emergency,	2,236 28	2,042 51	—1,458 77[1]	—1,652 54
Women's dormitories,	724 71	542 00	–	—182 71
Zoölogy and geology,	243 55	175 38	100 00	31 63
1917 celebration,	1,751 94	–	1,710 00	—41 94
Maintenance, general: —				
Farm,	47,778 65	41,988 56	7,500 00	1,709 91
General horticulture,	8,326 81	2,671 87	4,000 00	—1,654 94
Graduate school,	82 57	–	100 00	17 43
Grounds,	4,780 99	92 24	4,400 00	—288 75
Library,	6,238 82	480 07	5,250 00	—508 75
Operating and maintenance,	86,129 77	9,628 37	74,000 00	—12,129 77
State Treasurer, maintenance,	–	115,000 00	–	–
Land,	5,000 00	–	5,000 00	–
Endowment fund,	–	10,613 32	–	–
Instruction: —				
Salaries,	141,094 06	676 81	153,000 00	12,582 75
United States Treasurer, Morrill fund,	–	16,666 66	–	–
United States Treasurer, Nelson fund,	–	16,666 67	–	–
State Treasurer, instruction,	–	115,000 00	–	–
Graduate school,	–	3,000 00	–	–
Totals,	$432,516 87	$433,397 18	$325,270 00	–
Balance beginning fiscal year Dec. 1, 1917,	–	18,266 00	–	–
Balance on hand Nov. 30, 1918,	19,146 31[2]	–	–	–
Totals,	$451,663 18	$451,663 18	–	–

[1] Balance from previous year.

[2] This amount has been increased by $298.13 from experiment station to make it agree with the amount that we should have on hand from the Federal government.

College Accounts.

Comparative Disbursements and Receipts for 1917–18.

Accounts.	Disbursements.		Receipts.	
	1917.	1918.	1917.	1918.
Agricultural economics,	$224 12	$262 55	–	–
Agricultural education,	206 57	323 67	$10 70	–
Agronomy,	805 16	772 83	481 10	$199 12
Animal husbandry,	588 91	376 50	278 96	139 50
Beekeeping,	1,865 19	1,025 52	467 83	588 12
Botany,	1,415 68	1,377 19	1,112 52	320 50
Chemistry,	4,639 72	3,093 18	2,808 46	1,545 92
Dairying,	26,006 60	31,821 36	21,451 75	26,479 19
Dean's office,	564 10	388 40	–	43 43
Economics and sociology,	45 82	74 65	–	–
Entomology,	517 83	393 08	126 44	25 90
Equipment,	3,604 43	–	–	–
Executive order,	6,169 82	5,649 07	10 50	14 91
Farm management,	285 48	349 61	171 05	138 56
Farm,	42,767 91	47,778 65	31,002 93	41,988 56
Floriculture,	6,119 57	5,873 28	3,543 58	2,407 98
Forestry,	283 99	120 81	109 00	7 00
Freshman agriculture,	20 54	88 54	115 00	238 55
General agriculture,	1,539 66	1,538 01	12 26	75
General horticulture,	8,185 28	8,326 81	4,293 23	2,671 87
Graduate school,	273 55	82 57	3 00	–
Grounds,	4,360 68	4,780 99	109 57	92 24
History and government,	4 03	–	–	–
Horticulture manufacturing,	–	1,893 63	–	374 33
Hospital,	1,848 25	1,565 61	90 00	280 32
Land,	7,200 00	5,000 00	5,000 00	5,000 00
Landscape gardening,	344 43	178 53	268 97	157 71
Language and literature,	287 42	382 73	232 00	112 00
Library,	6,844 99	6,238 82	501 10	480 07
Market gardening,	4,116 42	5,037 99	2,885 44	3,423 29
Market-garden field station,	–	1,121 94	–	2,317 46
Mathematics,	215 45	151 21	107 75	60 10
Military,	1,521 24	1,003 49	4 40	89 41
Microbiology,	1,417 04	836 54	647 50	434 45
Mount Toby,	52 96	7,139 81	–	357 00
Physical education,	880 65	452 64	–	–
Physics,	527 12	556 60	72 00	76 00
Pomology,	3,402 54	3,340 64	2,089 48	2,635 05
Poultry husbandry,	14,540 68	16,812 64	10,422 16	16,449 05
President's office,	1,330 99	1,828 64	16 28	26 00
Registrar's office,	590 92	592 26	–	–
Rural engineering,	583 74	544 47	367 46	191 00
Rural sociology,	149 72	101 87	–	–
Salaries,	177,132 79	170,048 15	157 00	676 81
Treasurer's office,	1,080 01	1,184 60	–	–
Veterinary science,	1,076 31	920 54	90 14	20 12
War emergency,	1,540 32	2,236 28	81 55	2,012 51
Women's dormitories,	–	724 71	–	542 00
Zoölogy and geology,	527 60	243 55	518 00	175 38
1917 celebration,	2,106 67	1,751 94	–	–
Operating and maintenance,	76,587 09	86,129 77	12,313 82	9,628 37
State Treasurer: —				
Endowment fund,	–	–	10,613 32	10,613 32
Graduate school,	–	–	3,000 00	3,000 00
Maintenance,	–	–	121,500 00	110,000 00
Instruction,	–	–	105,000 00	115,000 00
Administration,	–	–	39,000 00	39,000 00
United States Treasurer: —				
Morrill fund,	–	–	16,666 67	16,666 66
Nelson fund,	–	–	16,666 66	16,666 67
Totals,	$416,399 99	$432,516 87	$414,419 58	$433,397 18
Balance beginning fiscal year,	–	–	19,696 41	18,266 00[1]
Balance on hand at close of fiscal year,	17,716 00[1]	19,146 31	–	–
Totals,	$434,115 99	$451,663 18	$434,115 99	$451,663 18

[1] Difference in balance due to an overdraft on land Dec. 1, 1917.

COLLEGE ACCOUNTS — *Concluded.*

Summary.

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1917,	–	$18,266 00
Institution receipts Nov. 30, 1918,	–	117,450 53
State Treasurer's receipts Nov. 30, 1918,	–	282,613 32
United States Treasurer's receipts Nov. 30, 1918,	–	33,333 33
Total disbursements,	$432,516 87	–
	$432,516 87	$451,663 18
Bills receivable Dec. 1, 1917, deducted,	–	10,034 55
Bills payable Dec. 1, 1917, deducted,	3,781 30	–
	$428,735 57	$441,628 63
Bills receivable Nov. 30, 1918,	–	5,972 27
Bills payable Nov. 30, 1918,	7,961 55	–
Balance,	10,903 78	–
	$447,600 90	$447,600 90

Farm Disbursements.

	Labor.	Equipment.	Feed.	Fertilizer.	Seeds.	Supplies.	Improvements.	Totals.
Cattle,	$7,306 77	–	$1,117 88	–	–	$836 41	–	$9,261 06
Dairy,	2,313 67	$103 43	–	–	–	2,649 72	–	5,066 82
Horses,	2,081 02	–	2,652 85	–	–	1,321 11	–	6,054 98
Sheep,	556 15	–	–	–	–	72 59	–	628 74
Swine,	889 70	–	730 43	–	–	128 58	–	1,748 71
Field crops,	5,147 00	–	–	$1,010 02	$562 02	55 55	–	6,774 59
Miscellaneous,	1,837 48	–	–	–	–	97 80	$1,267 15	3,202 43
Tools and machinery,	–	–	–	–	–	1,068 97	–	1,068 97
Live stock,	–	–	–	–	–	13,972 35	–	13,972 35
Totals,	$20,131 79	$103 43	$4,501 16	$1,010 02	$562 02	$20,203 08	$1,267 15	$47,778 65

Farm Credits.

	Onions.	Milk.	Stock.	Sundry.	Hay.	Roots.	Labor.	Potatoes.	Totals.
Cattle,	–	–	$4,510 00	$269 93	–	–	$33 42	–	$4,813 35
Dairy,	–	$27,174 09	–	71	–	–	–	–	27,174 80
Horses,	–	–	1,359 33	590 08	–	–	811 74	–	2,761 15
Sheep,	–	–	766 00	228 20	–	–	–	–	994 20
Swine,	–	–	2,647 94	–	–	–	–	–	2,647 94
Field crops,	$33 85	–	–	46 20	$175 07	$0 50	–	$2,386 50	2,642 12
Miscellaneous,	–	–	–	79 40	–	–	875 60	–	955 00
Totals,	$33 85	$27,174 09	$9,283 27	$1,214 52	$175 07	$0 50	$1,720 76	$2,386 50	$41,988 56

Agricultural Division.

Disbursements and Receipts.

	Disbursements.	Receipts.
Agronomy,	$772 83	$199 12
Animal husbandry,	376 50	139 50
Dairying,	31,821 36	26,479 19
Farm,	47,778 65	41,988 56
Farm management,	349 61	138 56
Poultry husbandry,	16,812 64	16,449 05
Rural engineering,	544 47	191 00
Division totals,	$98,456 06	$85,584 98

Summary.

	Dr.	Cr.
By total division receipts,		$85,584 98
By bills receivable,		3,683 50
By net apportionment,		18,150 00
To total disbursements,	$98,456 06	
To bills payable,	3,225 86	
Balance,	5,736 56	
	$107,418 48	$107,418 48

Inventory of Quick Assets.

	Nov. 30, 1917.	Nov. 30, 1918.
Inventory of produce,	$12,668 84	$10,550 24
Inventory of cattle,	17,485 00	17,100 00
Inventory of swine,	1,495 00	1,957 00
Inventory of horses,	6,440 00	4,675 00
Inventory of poultry,	2,531 75	2,682 10
Inventory of sheep,	1,013 00	1,655 00
	$41,633 59	$38,619 34

Horticultural Division.

Disbursements and Receipts.

	Disbursements.	Receipts.
Floriculture,	$5,873 28	$2,407 98
Forestry,	120 81	7 00
General horticulture,	8,326 81	2,671 87
Grounds,	4,780 99	92 24
Landscape gardening,	178 53	157 71
Market gardening,	5,037 99	3,423 29
Pomology,	3,340 64	2,635 05
Division totals,	$27,659 05	$11,395 14

Summary.

	Dr.	Cr.
By total division receipts,		$11,395 14
By bills receivable,		1,563 02
By net apportionment,		14,340 00
To total division disbursements,	$27,659 05	
To bills payable,	128 11	
By balance,		489 00
	$27,787 16	$27,787 16

Inventory of Quick Assets.

	Nov. 30, 1917.	Nov. 30, 1918.
Mount Toby,	–	$9,260 00
Floriculture,	$1,200 00	1,200 00
Market gardening,	917 50	805 00
Pomology,	419 00	1,181 00
General horticulture (live stock),	1,810 00	1,663 00
	$4,346 50	$14,109 00

Expense Operating and Maintenance.

	Salaries.	Labor.	Fuel and Water.	Repairs.	Supplies.	Tools.	Architect.	Engineer.	Miscellaneous.	Totals.
General: —										
General superintendent,	$3,529 49	–	–	–	–	–	–	–	–	$3,529 49
Office,	680 00	–	–	–	$163 30	–	–	–	–	843 30
General expense,	–	–	–	–	210 92	–	–	–	–	210 92
Power plant: —										
Heat,	–	$8,666 46	$49,542 99	$1,014 53	72	–	–	–	–	59,224 70
Light,	–	978 92	29 61	255 07	–	–	–	–	–	1,263 60
Tools,	–	–	–	–	–	$829 38	–	–	–	829 38
Amherst Water Company,	–	–	1,999 86	–	–	–	–	–	–	1,999 86
Night watchman,	–	1,517 34	–	–	–	–	–	–	–	1,517 34
Mail service,	–	391 50	–	–	–	–	–	–	–	391 50
Water mains,	–	109 12	–	–	–	–	–	–	–	109 12
Steam mains,	–	258 58	–	–	–	–	–	–	–	258 58
Electric light circuit,	–	1,173 09	–	–	–	–	–	–	–	1,173 09
Waiting station,	–	3 00	–	–	–	–	–	–	–	3 00
Miscellaneous sundry,	–	–	–	–	–	–	–	–	$2,654 78	2,654 78
Sewers and cesspools,	–	171 19	–	–	–	–	–	–	–	171 19
Walks,	–	165 93	–	–	–	–	–	–	–	165 93
Emergency maintenance,	–	1,593 73	–	–	–	–	–	–	–	1,593 73
Expert service,	–	–	–	–	–	–	$790 65	$129 36	26 35	946 36
Fire department,	–	–	–	–	92 28	–	–	–	–	92 28
Totals,	$4,209 49	$15,028 86	$51,572 46	$1,269 60	$467 22	$829 38	$790 65	$129 36	$2,681 13	$76,978 15

EXPENSE OPERATING AND MAINTENANCE — *Concluded.*

	Electric Repairs.	Plumbing Repairs.	Heat Repairs.	C. and M. Repairs.	Janitor.	Bell Ringing.	Sundry.	Totals.
College buildings: —								
Animal husbandry building,	$0 95	$1 65	$0 46	$0 83	–	–	–	$3 89
Apiary building,	4 17	–	–	10 90	–	–	–	15 07
Chemical building,	8 21	21 09	10 64	249 01	–	–	–	288 95
Clark Hall,	2 79	69 17	13 75	57 76	–	–	–	143 47
Cold-storage building,	–	–	–	45	–	–	–	45
Dairy building,	12 11	51 01	74 55	142 46	–	–	–	280 13
Dairy barn and storage,	5 21	58 05	32 50	81 76	–	–	–	177 52
Draper Hall,	36 80	498 28	47 84	270 74	–	–	$597 64	1,451 30
Drill hall,	48	77 41	69	64 13	–	–	–	142 71
Durfee glasshouse (old),	–	3 32	–	46 51	–	–	–	49 83
Entomology building,	98	24 17	46 37	41 74	–	–	–	113 26
French Hall,	74 50	4 22	7 95	67	–	–	–	87 34
Horse barn,	–	5 56	1 25	43 97	–	–	–	50 78
Horticulture barn,	2 90	–	9 81	10 62	–	–	–	23 33
Hospital,	3 54	9 46	6 84	51 28	–	–	–	71 12
Machine barn,	–	–	–	6 28	–	–	–	6 28
Mathematics building,	–	–	5 54	–	–	–	–	5 54
Microbiology building,	31 88	93 82	2 80	3 95	–	–	–	132 45
Physics building,	–	7 04	–	7 38	–	–	–	14 42
Piggery,	–	2 50	–	2 40	–	–	–	4 90
Poultry No. 1,	–	1 00	92	17 83	–	–	–	19 75
Poultry No. 2,	48	–	–	53	–	–	–	1 01
Poultry No. 3,	–	11 37	–	62	–	–	–	11 99
Poultry No. 4,	–	15 34	–	15 89	–	–	–	31 23
Poultry No. 5,	–	–	–	3 16	–	–	–	3 16
Poultry No. 6,	–	–	–	61	–	–	–	61
Poultry No. 7,	–	–	–	61	–	–	–	61
Poultry No. 8,	–	–	–	11 23	–	–	–	11 23
Poultry No. 9,	–	–	–	15 99	–	–	–	15 99
Poultry No. 10,	–	–	–	3 89	–	–	–	3 89
Poultry No. 11,	–	–	–	3 39	–	–	–	3 39
Poultry No. 12,	–	–	–	3 20	–	–	–	3 20
Power building,	130 73	25 89	72 09	62 84	$167 92	–	–	459 47
Rural engineering building,	–	–	1 07	15 24	–	–	–	16 31
Sheep barn,	–	2 16	–	–	–	–	–	2 16
Stockbridge Hall,	9 65	20 53	20 71	74 87	–	–	–	125 76

Agronomy greenhouse,	–	–	2 61	12 92	–	–	–	15 53
Upper plant house,	–	–	13 49	–	–	–	–	13 49
Veterinary building,	–	1 07	65	10 47	–	–	–	12 19
Wilder Hall,	48	21 50	5 67	154 93	–	–	–	182 58
Young stock barn,	6 10	17 99	–	50 56	–	–	–	74 65
East experiment station,	–	3 17	9 80	59 95	–	–	–	72 92
East experiment station barn,	2 66	–	–	18 40	–	–	–	21 06
West experiment station,	35 71	26 49	4 01	54 63	–	–	–	120 84
West experiment station barn,	6 16	6 14	1 86	129 78	–	–	–	143 94
North college,	61 25	7 84	19 04	177 03	389 81	–	68 08	723 05
South college,	69 18	36 46	3 42	256 04	424 78	–	120 70	910 58
Chapel,	35 31	29 24	1 54	76 49	173 39	$61 00	–	376 97
College residences: —								
Cashier's house,	102 29	71 92	48 04	502 57	–	–	29 33	754 15
Farm bungalow,	30 26	164 42	27 01	443 81	–	–	–	665 50
Farmhouse No. 1,	48	5 61	–	23 90	–	–	–	29 99
Farmhouse No. 2,	–	50 37	–	628 20	–	–	–	678 57
Goldberg house,	–	11 94	–	62 19	–	–	26 25	100 38
Harlow house,	–	10 51	–	58 79	–	–	–	69 30
Head of division of horticulture,	10	–	–	22 77	–	–	–	22 87
Kellogg house,	–	2 47	1 61	89 60	–	–	10 93	104 61
President's house,	14 10	37 46	20 06	109 34	–	–	9 52	190 48
Stockbridge house,	–	2 57	–	49 33	–	–	–	51 90
Tillson house,	–	14	–	79	–	–	–	93
Farm house No. 3,	–	–	–	14 21	–	–	–	14 21
Farm house No. 4,	–	–	–	14 22	–	–	–	14 22
Farm house No. 5,	–	–	–	14 21	–	–	–	14 21
Totals,	$689 46	$1,510 35	$514 59	$4,357 87	$1,155 90	$61 00	$862 45	$9,151 62

Summary.

General,	$76,978 15
College buildings,	6,440 30
College residences,	2,711 32
Total,	$86,129 77

Experiment Station.

Disbursements and Receipts.

Accounts.	Disbursements from Dec. 1, 1917, to Nov. 30, 1918.	Receipts from Dec. 1, 1917, to Nov. 30, 1918.	Apportionment for Year ending Nov. 30, 1918.	Balance to Credit.
Administration,	$888 49	$40 65	$1,200 00	$352 16
Agriculture,	9,627 26	6,064 36	3,100 00	—462 90
Agricultural economics,	355 71	–	900 00	544 29
Apiculture,	–	–	120 00	120 00
Botanical,	2,202 50	–	2,250 00	47 50
Chemical,	14,641 14	13,423 39	1,150 00	—67 75
Cranberry,	5,705 37	6,220 20	3,800 00	4,314 83
Entomological,	603 71	–	625 00	21 29
Equipment,	11 00	–	750 00	739 00
Feed inspection,	6,925 28	6,053 00	1,275 50[1]	403 22
Fertilizer inspection,	9,519 67	7,007 50	612 41[1]	—1,899 76
Freight and express,	334 71	8 65	400 00	73 94
Graves' orchard,	126 38	1,004 50	–	878 12
Horticultural,	2,142 69	61 66	1,800 00	—281 03
Library,	218 39	–	700 00	481 61
Meteorology,	325 82	–	400 00	74 18
Microbiology,	947 61	–	1,500 00	552 39
Poultry,	2,316 15	19 63	2,000 00	—296 52
Pomology,	–	3 40	–	3 40
Publications,	247 94	–	800 00	552 06
Salaries,	47,123 30	–	52,205 00	5,081 70
Tillson farm,	3,390 51	1,010 94	2,000 00	—379 57
Treasurer's office,	246 46	–	400 00	153 54
Veterinary,	270 98	206 35	725 00	660 37
Hatch fund,	–	15,000 00	–	–
Adams fund,	–	15,000 00	–	–
State fund,	–	40,000 00	–	–
Totals,	$103,171 07	$111,124 23	$76,825 00	–
Balance beginning fiscal year Dec. 1, 1917.	–	8,688 34	–	–
Balance on hand Nov. 30, 1918,	11,641 50[2]	–	–	–
Totals,	$119,812 57	$119,812 57	–	–

[1] Balance from previous year.

[2] $298.13 taken to balance the college account, and $8,406.08 transferred to the State Treasurer under date of November 30.

EXPERIMENT STATION — *Continued.*

Comparative Disbursements and Receipts, 1917–18.

ACCOUNTS.	DISBURSEMENTS.		RECEIPTS.	
	1917.	1918.	1917.	1918.
Administration,	$1,234 51	$888 49	$3 48	$40 65
Agriculture,	8,490 16	9,627 26	4,810 22	6,064 36
Agricultural economics,	368 21	355 71	–	–
Apiculture,	51 12	–	–	–
Botanical,	2,103 43	2,202 50	32 90	–
Chemical,	12,970 28	14,641 14	11,939 54	13,423 39
Cranberry,	3,528 49	5,705 37	3,172 02	6,220 20
Entomological,	413 18	603 71	75	–
Equipment,	197 72	11 00	–	–
Feed inspection,	6,772 57	6,925 28	6,000 00	6,053 00
Fertilizer inspection,	9,287 40	9,519 67	9,040 00	7,007 50
Freight and express,	256 70	334 71	5 51	8 65
Graves' orchard,	533 64	126 38	133 48	1,004 50
Horticultural,	1,832 30	2,142 69	7 85	61 66
Library,	518 51	218 39	–	–
Meteorology,	358 22	325 82	–	–
Microbiology,	1,704 14	947 61	–	–
Poultry,	1,907 25	2,316 15	–	19 63
Pomology,	–	–	–	3 40
Publications,	735 22	247 94	–	–
Salaries,	45,271 80	47,123 30	–	–
Tillson farm,	1,666 66	3,390 51	1,120 55	1,010 94
Treasurer's office,	336 59	246 46	–	–
Veterinary,[1]	1,123 57	270 98	560 31	206 35
Hatch fund,	–	–	15,000 00	15,000 00
Adams fund,	–	–	15,000 00	15,000 00
State fund,	–	–	35,000 00	40,000 00
Totals,	$101,661 67	$108,171 07	$101,826 61	$111,124 23
Balance beginning of fiscal year,	–	–	8,523 40	8,688 34
Balance on hand at close of fiscal year,	8,688 34	11,641 50	–	–
Totals,	$110,350 01	$119,812 57	$110,350 01	$119,812 57

[1] This includes blood test.

Experiment Station — *Concluded.*

Analysis of Experiment Station Accounts.

	Adams Fund.	Feed Law.	Fertilizer Law.	Hatch Fund.	State Fund.	Totals.
Salaries,	$14,987 31	$4,114 64	$6,614 16	$13,890 68	$18,245 31	$57,852 10
Labor,	192 05	303 79	524 86	1,109 55	26,361 25	28,491 50
Publications,	–	348 20	670 80	–	181 00	1,200 00
Postage and stationery,	–	30 94	99 34	–	1,148 02	1,278 30
Freight and express,	–	41 36	26 57	–	416 99	484 92
Heat, light, water and power,	–	61 31	110 06	–	447 13	618 50
Chemical and laboratory supplies,	78 05	456 63	533 19	20 59	1,114 36	2,202 82
Seeds, plants and sundry supplies,	126 30	83 65	63 79	33 23	3,613 75	3,920 72
Fertilizers,	–	–	–	78 29	1,649 62	1,727 91
Feed stuffs,	–	54 40	–	6 30	2,479 43	2,540 13
Library,	–	–	2 50	–	320 95	323 45
Tools, machinery and appliances,	–	35 00	–	–	378 77	413 77
Furniture and fixtures,	–	83 73	–	1 20	115 61	200 54
Scientific apparatus and specimens,	18 00	–	39 98	5 32	178 20	241 50
Live stock,	–	25 00	–	–	155 00	180 00
Traveling expenses,	–	867 63	834 42	–	3,230 24	4,932 29
Contingent expenses,	–	5 00	–	–	20 00	25 00
Buildings and land,	–	414 00	–	–	1,123 62	1,537 62
Totals,	$15,401 71	$6,925 28	$9,519 67	$15,145 16	$61,179 25	$108,171 07

Summary.

	Disbursements.	Receipts.
Cash on hand Dec. 1, 1917,	–	$8,688 34
Receipts from State Treasurer,	–	46,000 00
Receipts from United States Treasurer,	–	30,000 00
Receipts from other sources,	–	35,124 23
Total disbursements,	$108,171 07	–
	$108,171 07	$119,812 57
Bills receivable Dec. 1, 1917, deducted,	–	4,452 97
Bills payable Dec. 1, 1917, deducted,	218 78	–
	$107,952 29	$115,359 60
Bills receivable Nov. 30, 1918,	–	2,599 44
Bills payable Nov. 30, 1918,	424 64	–
Balance,	9,582 11	–
	$117,959 04	$117,959 04

Extension Service.

Disbursements and Receipts.

Classification.	Disbursements.	Receipts.	Apportionment.	Balance.
Administration,	$997 47	$166 22	$2,000 00	$1,168 75
Animal husbandry,	416 28	–	700 00	283 72
Beekeeping,	99 16	–	–	—99 16
Co-operative marketing,	867 39	–	300 00	—567 39
Correspondence courses,	901 41	394 25	800 00	292 84
County agents' work,	995 47	–	1,000 00	4 53
Dairying,	285 72	–	500 00	214 28
Director's office,	2,461 83	115 33	2,300 00	—46 50
Exhibits,	939 48	282 50	600 00	—56 98
Farm management demonstration,	200 88	56 25	250 00	105 37
Home economics,	746 56	13 04	1,165 35	431 83
Home gardening,	46 42	–	–	—46 42
Horticulture manufacturing,	68 56	11 25	150 00	92 69
Injurious insects,	56	–	–	—56
Junior extension work,	2,359 71	46 10	2,400 00	86 39
Lectures,	53 12	–	300 00	246 88
Library extension,	198 99	–	200 00	1 01
Local community organization,	949 64	–	700 00	—249 64
Plant diseases,	2 25	–	50 00	47 75
Pomology,	554 50	–	1,000 00	445 50
Poultry husbandry,	826 28	60 04	1,000 00	233 76
Printing,	2,161 04	385 77	1,050 00	—725 27
Rural civic planning,	26 70	156 09	50 00	179 39
Salaries,	29,533 11	691 66	27,620 00	—1,221 45
Sheep husbandry,	35 80	–	50 00	14 20
Short courses,	6,555 29	1,174 12	8,400 00	3,018 83
War emergency,	1,558 09	45 97	37 49	—1,474 63
State Treasurer,	–	50,000 00	–	–
Totals,	$53,841 71	$53,598 59	$52,622 84	$2,379 72
Balance beginning fiscal year Dec. 1, 1917,	–	2,622 84	–	–
Balance on hand Nov. 30, 1918,	2,379 72[1]	–	–	–
Totals,	$56,221 43	$56,221 43	–	–

[1] This amount transferred to the State Treasurer under date of November 30.

Summary.

	Disbursements.	Receipts.
Balance Dec. 1, 1917,[1]	–	$5,606 32
Receipts Nov. 30, 1918,	–	3,598 59
Received from State Treasurer,	–	50,000 00
Received from United States Treasurer,	–	19,036 48
Disbursements to Nov. 30, 1918,[1]	$73,243 56	–
	$73,243 56	$78,241 39
Bills receivable Dec. 1, 1917, deducted,	–	776 12
Bills payable Dec. 1, 1917, deducted,	139 72	–
	$73,103 84	$77,465 27
Bills receivable Nov. 30, 1918,	–	138 03
Bills payable Nov. 30, 1918,	69 25	–
Balance,	4,430 21	–
	$77,603 30	$77,603 30

[1] Includes Federal Smith-Lever fund.

Extension Service — *Concluded.*

Analysis of Extension Service Disbursements.

	Travel.	Equipment.	Supplies.	Instruction and Lectures.	Salaries.	Miscellaneous.	Labor.	Totals.
Administration,	$878 74	$14 00	$104 73	–	–	–	–	$997 47
Animal husbandry,	382 45	2 75	31 08	–	–	–	–	416 28
Agricultural camps,	–	–	2 00	–	–	–	$35 68	37 68
Beekeeping,	–	–	76 36	–	–	–	22 80	99 16
Correspondence courses,	74 97	23 60	719 26	–	–	–	83 58	901 41
Co-operative marketing,	574 64	46 50	246 25	–	–	–	–	867 39
County agents' work,	807 91	71 73	115 83	–	–	–	–	995 47
County agents' conference,	35 67	–	79 05	–	–	–	–	114 72
Dairying,	150 72	5 87	129 13	–	–	–	–	285 72
Director's office,	107 39	408 36	1,627 41	–	–	–	318 67	2,461 83
Exhibits,	521 91	66 00	332 30	–	–	–	19 27	939 48
Farm management demonstration,	–	2 87	163 01	–	–	–	35 00	200 88
Farmers' week,	210 80	–	442 09	$105 00	–	–	–	757 89
Home economics,	348 82	52 53	298 23	–	–	–	46 98	746 56
Home gardening,	–	28 10	18 32	–	–	–	–	46 42
Horticulture manufacturing,	52 13	–	16 43	–	–	–	–	68 56
Injurious insects,	–	–	56	–	–	–	–	56
Junior extension work,	1,519 38	106 09	554 80	–	–	–	179 44	2,359 71
Lectures,	47 85	–	5 27	–	–	–	–	53 12
Library extension,	–	188 21	10 78	–	–	–	–	198 99
Local community organization,	702 01	–	215 21	–	–	–	32 42	949 64
Miscellaneous schools,	–	–	36 53	–	–	–	–	36 53
Plant diseases,	–	–	2 25	–	–	–	–	2 25
Pomology,	441 74	66 68	46 08	–	–	–	–	554 50
Poultry convention,	58 77	–	203 54	45 00	–	–	–	307 31
Poultry husbandry,	568 18	32 96	225 14	–	–	–	–	826 28
Printing,	81 34	–	2,079 70	–	–	–	–	2,161 04
Rural civic planning,	22 50	–	4 20	–	–	–	–	26 70
Salaries,	–	–	–	–	$30,683 12	–	–	30,683 12
Sheep husbandry,	–	10 95	24 85	–	–	–	–	35 80
Summer school,	59 54	–	399 70	1,833 00	–	$431 41	–	2,723 65
Ten weeks' course,	72 87	–	321 68	100 00	–	878 41	–	1,372 96
Tractor school,	5 98	–	48 56	–	–	–	–	54 54
War emergency,	425 76	91 13	398 71	–	412 06	–	230 43	1,558 09
Totals,	$8,152 07	$1,218 33	$8,979 04	$2,083 00	$31,095 18	$1,309 82	$1,004 27	$53,841 71

Smith-Lever Fund (Federal).

	Disbursements.	Receipts.
Beekeeping,	$7 37	-
Dairying,	448 72	-
Extension schools,	206 70	-
District and county agents,	-	-
Farm management demonstration,	394 97	-
Home gardening,	647 60	-
Horticulture manufacturing,	104 97	-
Junior extension work,	1,663 73	-
Plant diseases,	464 29	-
Poultry husbandry,	364 55	-
Printing and publications,	756 16	-
Salaries,	13,784 61	-
Sheep husbandry,	558 18	-
State Treasurer,	-	$19,036 48
Totals,	$19,401 85	$19,036 48
Balance beginning of fiscal year Dec. 1, 1917,	-	2,983 48
Balance on hand Nov. 30, 1918,	2,618 11	-
Totals,	$22,019 96	$22,019 96

Special Appropriations.

	Date made.	Appropriation.	Amount expended to Date.	Unexpended Balance.
Agricultural building,	1914	$210,000 00	$209,074 65	$925 35
Microbiology building,	1915	67,500 00	65,450 31	2,049 69
Agricultural building,	1916	13,732 34	12,243 49	1,488 85
Rural engineering building,	1916	12,000 00	11,997 57	2 43
Market-garden field station,	1916	8,000 00	8,000 00	-
Improvement and equipment,	1917	33,500 00	32,786 52	713 48
Market-garden field station,	1917	10,000 00	10,000 00	-
Power plant improvements,	1917	40,000 00	36,948 78	3,051 22
Improvement and equipment,	1918	20,000 00	8,048 18	11,951 82
Power plant improvements,	1918	54,500 00	4,802 26	49,697 74
Market-garden field station,	1918	16,500 00	5,833 48	10,666 52
Dining hall,	1918	12,000 00	9,502 54	2,497 46
Totals,	-	$497,732 34	$414,687 78	$83,044 56
Amount spent previous to Dec. 1, 1917,	-	-	-	386,554 41
Amount expended during fiscal year,	-	-	-	28,133 37
Unexpended balance Nov. 30, 1918,	-	-	83,044 56	-
	-	$497,732 34	$497,732 34	$497,732 34

Inventory — Real Estate.

Land (Estimated Value).

Angus land,	$800 00
Allen place,	500 00
Baker place,	2,500 00
Bangs place,	2,350 00
Brown land,	500 00
Charmbury place,	450 00
Clark place,	4,500 00
College farm,	37,000 00
Cranberry land,	10,975 50
Geo. Cutler, Jr., trustee,	2,700 00
Dickinson land,	7,850 00
Harlow farm,	1,584 63
Hawley and Brown place,	675 00
Kellogg place,	3,368 45
Loomis place,	415 00
Louisa Baker place,	5,000 00
Market-garden field station,	4,800 00
Mount Toby demonstration forest,	30,000 00
Newell farm,	2,800 00
Old creamery place,	1,000 00
Owen farm,	5,000 00
Pelham quarry,	500 00
Tillson farm,	2,950 00
Westcott place,	2,250 00
Total,	$130,468 58

College Buildings (Estimated Value).

	Inventory at Beginning of Year.	Per Cent. deducted.	Value at Beginning of Year less Deterioration.	Repairs and Improvements during Year.	Total Value at Close of Fiscal Year.
Apiary,	$3,089 76	2	$3,027 96	$15 07	$3,043 03
Animal husbandry building,	9,578 24	2	9,386 68	3 89	9,390 57
Cashier's house,	954 47	5	906 75	754 15	1,660 90
Chemical laboratory,	8,317 90	5	7,902 00	288 95	8,190 95
Clark Hall,	64,493 78	2	63,203 90	791 70	63,995 60
Cold-storage laboratory,	11,417 98	2	11,189 62	45	11,190 07
Dairy building,	72,308 71	2	70,862 54	364 32	71,226 86
Dairy barn and storage,	28,270 22	3	27,422 11	177 52	27,599 63
Dining hall,	56,995 88	3	55,286 00	10,511 49	65,797 49
Drill hall and gun shed,	9,166 61	5	8,708 28	182 96	8,891 24
Durfee glass houses, old,	8,981 62	5	8,532 54	49 83	8,582 37
Durfee glass houses, new,	13,155 49	5	12,497 72	–	12,497 72
Entomology building,	76,212 29	2	74,688 04	113 26	74,801 30
Farm bungalow,	2,049 85	3	1,988 35	665 50	2,653 85
Farmhouse,	2,538 40	3	2,462 25	29 99	2,492 24
Farmhouse No. 2,	4,167 34	8	3,833 95	678 57	4,512 52
French Hall,	47,942 97	2	46,984 11	87 34	47,071 45
Grounds' tool shed,	–	–	–	–	245 00
Harlow house,	1,615 00	5	1,534 25	69 30	1,603 55
Horse barn,	4,741 21	3	4,598 97	50 78	4,649 75
Head of division of horticulture,	2,441 74	5	2,319 65	22 87	2,342 52
Horticultural barn,	2,484 89	3	2,410 34	23 33	2,433 67
Horticultural tool shed,	1,825 35	3	1,770 59	–	1,770 59

College Buildings (Estimated Value) — Concluded.

	Inventory at Beginning of Year.	Per Cent. deducted.	Value at Beginning of Year less Deterioration.	Repairs and Improvements during Year.	Total Value at Close of Fiscal Year.
Hospital,	$14,953 17	2	$14,654 11	$263 38	$14,917 49
Kellogg house,	2,384 09	5	2,264 89	104 61	2,369 50
Machinery barn,	3,669 14	3	3,559 07	6 28	3,565 35
Market-garden field station barn,	3,500 00	3	3,395 00	–	3,395 00
Mathematical building,	5,452 15	5	5,179 54	5 54	5,185 08
Microbiology building,	61,070 77	2	59,849 35	132 45	59,981 80
Military storage,	–	–	–	–	250 00
Mount Toby house and barn,	3,800 00	5	3,610 00	397 18	4,007 18
North dormitory,	24,781 10	2	24,285 48	265 16	24,550 64
Physics laboratory,	4,904 27	5	4,659 06	14 42	4,673 48
Piggery,	2,750 59	3	2,668 07	4 90	2,672 97
Poultry department: —					
No. 1 demonstration building,	1,361 60	2	1,334 37	19 75	1,354 12
No. 2 oil house,	72 03	2	70 59	1 01	71 60
No. 3 brooder, killing and fattening laboratory,	2,416 43	2	2,368 10	11 99	2,380 09
No. 4 mechanics, storage building and incubator cellar,	3,483 51	2	3,413 84	31 23	3,445 07
No. 5 laying house,	1,694 15	2	1,660 27	3 16	1,663 43
No. 6 manure shed,	96 04	2	94 12	61	94 73
No. 7 small henhouse,	48 02	2	47 06	61	47 67
No. 8 breeding house,	1,523 91	2	1,493 43	11 23	1,504 66
No. 9 experimental breeding house,	588 00	2	576 24	15 99	592 23
No. 10 duck house,	96 04	2	94 12	3 89	98 01
No. 11 unit house for 200 hens,	502 51	2	492 46	3 39	495 85
No. 12 unit house for 100 hens,	405 00	2	396 90	3 20	400 10
Power plant and storage building, including coal pocket,	38,596 88	2	37,824 94	9,585 59	47,410 53
President's house,	12,142 13	3	11,777 87	180 96	11,958 83
Quarantine barn,	501 97	3	486 91	–	486 91
Rural engineering building,	3,641 55	2	3,568 72	16 31	3,585 03
Sheep barn,	1,419 32	3	1,376 74	80 57	1,457 31
South dormitory,	35,346 29	2	34,639 36	451 54	35,090 90
Stockbridge Hall,	178,306 88	2	174,740 74	602 00	175,342 74
Agronomy greenhouse,	2,064 86	2	2,023 56	15 53	2,039 09
Stockbridge house,	1,426 66	5	1,355 33	51 90	1,407 23
Stone chapel,	28,576 68	2	28,005 15	318 52	28,323 67
Vegetable plant house,	4,184 51	5	3,975 28	390 96	4,366 24
Veterinary laboratory and stable,	22,966 16	2	22,506 84	12 19	22,519 03
Waiting station,	482 96	2	473 30	3 00	476 30
Wilder Hall,	35,498 45	2	34,788 48	182 58	34,971 06
Young stock barn,	6,055 16	3	5,873 51	74 65	5,948 16
Totals,	$943,512 68	–	$921,099 40	$28,147 55	$949,741 95

College Equipment (Estimated Value).

Administrative division: —	
Dean's office,	$464 05
President's office,	1,953 50
Registrar's office,	1,117 21
Treasurer's office,	2,816 25
Agricultural division: —	
Agronomy,	6,172 02
Animal husbandry,	772 64
Dairy,	18,604 35
Farm,	41,369 13
Farm management,	1,025 19
General agriculture,	3,999 85
Poultry,	6,809 10
Rural engineering,	3,783 73

Dining hall,		$19,281 85
Extension,		8,636 58
General science: —		
Apiary,		2,218 11
Botanical,		22,794 53
Chemical,		11,736 58
Entomology,		6,073 30
Mathematics,		2,434 50
Microbiology,		6,926 35
Physics,		6,814 32
Veterinary,		10,636 47
Zoölogical and geological,		17,154 28
Graduate school,		55 20
Horticultural division: —		
Floriculture,		29,850 66
Forestry,		2,158 04
General horticulture,		6,632 68
Grounds,		1,261 05
Horticultural manufacture,		2,760 70
Landscape gardening,		5,088 47
Market-garden field station,		2,435 05
Market gardening,		2,757 35
Mount Toby reservation,		9,732 80
Pomology,		6,090 91
Hospital,		1,089 10
Humanities division: —		
Economics and sociology,		199 52
Language and literature,		574 00
Library,		101,220 72
Military,		1,517 15
Operating and maintenance: —		
College supply,		1,913 64
Fire apparatus,		2,146 15
General maintenance,		161,625 34
Carpentry and masonry supplies,	$6,068 04	
Electrical supplies,	3,258 31	
Equipment,	142,246 79	
Heating and plumbing supplies,	8,804 41	
Painting supplies,	1,247 79	
Janitor's supplies,		959 34
Sewer line,		11,997 73
Water mains,		10,472 46
Physical education,		2,196 75
Rural social science: —		
Agricultural economics,		884 55
Agricultural education,		640 56
Rural sociology,		215 24
Textbooks,		2,269 14
Trophy room,		1,200 00
Total,		$573,538 19

Experiment Station Buildings (Estimated Value).

	Inventory at Beginning of Year.	Per Cent.	Cost at Beginning of Year less Per Cent. Deterioration.	Repairs and Improvements during Year.	Total Value at Close of Year.
Agricultural laboratory,	$14,704 49	2	$14,410 40	$72 92	$14,483 32
Agricultural barn,	4,684 65	3	4,544 11	41 12	4,585 23
Agricultural farmhouse,	1,375 40	3	1,334 14	100 38	1,434 52
Agricultural glass house,	428 69	5	407 26	–	407 26
Cranberry buildings,	2,365 50	5	2,247 22	471 29	2,718 51
Plant and animal chemistry laboratory,	28,659 61	2	28,086 42	120 84	28,207 26
Plant and animal chemistry barns,	3,964 99	3	3,846 04	206 22	4,052 26
Plant and animal chemistry dairy,	1,825 35	3	1,770 59	–	1,770 59
Six poultry houses,	585 72	2	574 01	–	574 01
Entomological glass houses,	782 33	5	743 21	12 83	756 04
Tillson house,	600 00	5	570 00	93	570 93
Tillson barn,	1,200 00	5	1,140 00	–	1,140 00
Totals,	$61,176 73	–	$59,673 40	$1,026 53	$60,699 93

Experiment Station Equipment (Estimated Value).

Agricultural economics department,	$58 27
Agricultural laboratory,	7,171 29
Botanical laboratory,	5,651 32
Chemical laboratory,	23,106 82
Cranberry station,	17,855 31
Director's office,	5,602 15
Entomological laboratory,	23,587 92
Horticultural laboratory,	4,507 65
Meteorological laboratory,	798 50
Microbiological laboratory,	1,651 25
Poultry department,	4,712 79
Treasurer's office,	1,092 00
Tillson farm,	500 00
Total,	$96,295 27

Inventory Summary.

Land,	$130,468 58
College buildings,	949,741 95
College equipment,	573,538 19
Experiment station buildings,	60,699 93
Experiment station equipment,	96,295 27
Total,	$1,810,743 92

	Acres.
College estate, area,	642.79
Cranberry station, Wareham, area,	23.67
Market-garden field station, Lexington, area,	12.00
Mount Toby demonstration forest, area,	755.27
Rifle range,	46.20
Pelham quarry,	.50
Total acreage,	1,480.43

Students' Trust Fund Account.

	Disbursements, Year ending Nov. 30, 1918.	Receipts, Year ending Nov. 30, 1918.	Balance on Hand.	Balance brought forward Dec. 1, 1917.
Athletics,	$2,856 62	$738 03	$172 84	$2,291 43
Dining hall,	39,829 59	33,363 04	—23,680 65	—17,214 10
Keys,	53 00	37 50	18 25	33 75
Student deposits,	18,927 68	19,167 78	10,568 65	10,328 55
Social union,	852 64	219 70	316 92	949 86
Textbooks,	3,365 94	3,586 55	998 67	778 06
Athletic field,	–	18 50	—354 71	—373 21
Uniforms,	1,945 77	38 17	21 04	1,928 64
Totals,	$67,831 24	$57,169 27	—$11,938 99	—$1,277 02
Balance on hand Dec. 1, 1917,	—1,277 02	–	–	–
Balance on hand Nov. 30, 1918,	–	—11,938 99	–	–
	$69,108 26	$69,108 26	–	–

Condensed Operating Statement of the Dining Hall.

		Operating Charges.	Income.
1917.			
Dec. 1.	Balance,	$17,214 10	–
1918.			
Nov. 30.	Total disbursements,	39,829 59	–
	Outstanding bills,	1,683 85	–
	Total collections,	–	$33,417 79
	Accounts outstanding,	–	13,317 61
	Inventory,	–	5,485 25
	Balance,	–	6,506 89
		$58,727 54	$58,727 54

Endowment Fund.[1]

	Principal.	Income.
United States grant (5 per cent.),	$219,000 00	$7,300 00
Commonwealth grant (3½ per cent.),	142,000 00	3,313 32
	–	$10,613 32

[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College received two-thirds of the income from the same.

Burnham Emergency Fund.

	Market Value Dec. 1, 1918.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s, at $860,	$1,720 00	$2,000 00	$80 00
Two bonds Western Electric Company 5s, at $980,	1,960 00	2,000 00	100 00
One United States Liberty Bond 4s, at	500 00	500 00	20 00
	$4,180 00	$4,500 00	$200 00
Unexpended balance Dec. 1, 1917,	–	–	680 55
	–	–	$880 55
United States Liberty Bond investment,	–	–	500 00
Cash on hand Nov. 30, 1918,	–	–	$380 55

Library Fund.

Five bonds New York Central & Hudson River Railroad Company 4s, at $800,	$4,000 00	$5,000 00	$200 00
Five bonds Lake Shore & Michigan Southern Railroad Company 4s, at $910,	4,550 00	5,000 00	200 00
Two shares New York Central & Hudson River Railroad Company stock, at $78,	156 00	200 00	10 00
Amherst Savings Bank, deposit,	167 77	167 77	7 50
	$8,873 77	$10,367 77	$417 50
Nov. 22, 1918, transferred to college library account,	–	–	417 50

Special Funds.

Endowed Labor Fund (the Gift of a Friend of the College).

Two bonds American Telephone and Telegraph Company 4s, at $860,	$1,720 00	$2,000 00	$80 00
Two bonds Lake Shore & Michigan Southern Railroad Company 4s, at $910,	1,820 00	2,000 00	80 00
One bond New York Central Railroad debenture 4s,	800 00	1,000 00	40 00
	$4,340 00	$5,000 00	$200 00
Amherst Savings Bank, deposit,	–	–	6 42
One bond Kansas City Street Railway 5½s,	–	–	55 00
Transfer from Kansas City Railroad to Louisville Gas and Electric 7s,	–	–	16 67
One bond Louisville Gas and Electric 7s,	–	–	1,000 00
Unexpended balance Dec. 1, 1917,	–	–	798 11
	–	$5,000 00	$2,076 20
Less amount of income for one bond Louisville Gas and Electric and one United States Liberty Bond, each $1,000,	–	–	2,000 00
Cash on hand Nov. 30, 1918,	–	–	$76 20

Whiting Street Scholarship Fund.

One bond New York Central debenture 4s,	$800 00	$1,000 00	$40 00
Amherst Savings Bank, deposit,	271 64	271 64	12 18
	$1,071 64	$1,271 64	$52 18
Unexpended balance Dec. 1, 1917,	–	–	290 69
Cash on hand Nov. 30, 1918,	–	–	$342 87

Special Funds — *Continued.*

Hills Fund.

	Market Value Dec. 1, 1918.	Par Value.	Income.
One United States Liberty Bond 4s, at	$1,000 00	$1,000 00	$40 00
One bond American Telephone and Telegraph Company 4s, at	860 00	1,000 00	40 00
One bond New York Central & Hudson River Railroad debenture 4s, at	800 00	1,000 00	40 00
One bond New York Central Railroad debenture 4s, at	800 00	1,000 00	40 00
Three bonds Pacific Telephone and Telegraph Company 5s, at $960,	2,880 00	3,000 00	150 00
One bond Western Electric Company 5s, at	980 00	1,000 00	50 00
Boston & Albany Railroad stock, 3⅝ shares at $145,	526 00	362 00	31 68
Amherst Savings Bank, deposit,	72 75	72 75	3 24
Electric Securities Company bonds, 1⁹⁄₅₀ bonds at $990,	1,168 00	1,180 00	59 00
Two bonds Louisville Gas and Electric 7s, $1,000,	2,000 00	2,000 00	–
	$11,086 75	$11,614 75	$453 92
Kansas City Street Railway 5½s,	–	–	110 00
Transfer from Kansas City Railway to Louisville Gas and Electric 7s,	–	–	33 33
Unexpended balance Dec. 1, 1917,	–	–	891 15
	–	–	$1,488 40
Less amount invested in United States Liberty Bond 4¼s,	–	–	1,000 00
	–	–	$488 40
Disbursements for fiscal year ending Nov. 30, 1918,	–	–	193 07
Cash on hand Nov. 30, 1918,	–	–	$295 33

Mary Robinson Fund.

Amherst Savings Bank, deposit,	$142 00	$142 00	$6 38
Boston & Albany Railroad stock, ⅜ share, at	54 00	38 00	3 32
Electric Securities Company bonds, 41⁄50 bond, at	812 00	820 00	41 00
	$1,008 00	$1,000 00	$50 70
Unexpended balance Dec. 1, 1917,	–	–	189 03
Cash on hand Nov. 30, 1918,	–	–	$239 73

Grinnell Prize Fund.

Ten shares New York Central & Hudson River Railroad stock, at $78,	$780 00	$1,000 00	$50 00
Unexpended balance Dec. 1, 1917,	–	–	245 74
	$780 00	$1,000 00	$295 74
Disbursements for prizes,	–	–	50 00
Cash on hand Nov. 30, 1918,	–	–	$245 74

Gassett Scholarship Fund.

One bond New York Central & Hudson River Railroad debenture 4s, at	$800 00	$1,000 00	$40 00
Amherst Savings Bank, deposit,	11 64	11 64	48
	$811 64	$1,011 64	$40 48
Unexpended balance Dec. 1, 1917,	–	–	223 23
Cash on hand Nov. 30, 1918,	–	–	$263 71

SPECIAL FUNDS — *Continued.*

Massachusetts Agricultural College (Investment).

	Market Value Dec. 1, 1918.	Par Value.	Income.
One share New York Central & Hudson River Railroad stock at	$78 00	$100 00	$5 00
Unexpended balance Dec. 1, 1917,	–	–	85 45
Cash on hand Nov. 30, 1918,	–	–	$90 45

Danforth Keyes Bangs Fund.

Two bonds Pacific Telephone and Telegraph Company 5s, at $960,	$1,920 00	$2,000 00	$100 00
Two bonds Union Electric Light and Power Company 5s, at $930,	1,860 00	2,000 00	100 00
Two bonds American Telephone and Telegraph Company 4s, at $860,	1,720 00	2,000 00	80 00
Interest from student loans,	–	–	39 11
	$5,500 00	$6,000 00	$319 11
Unexpended balance Dec. 1, 1917,	–	–	1,200 13
	–	–	$1,519 24
Investment United States Liberty Bond 4¼s,	–	–	1,000 00
	–	–	$519 24
Total loans made to students during fiscal year, $425 00			
Cash received on account of student loans, 929 00			
Excess of receipts over loans made,	–	–	504 00
Cash on hand Nov. 30, 1918,	–	–	$1,023 24

John C. Cutter Fund.

One bond Pacific Telephone and Telegraph Company 5s, at	$960 00	$1,000 00	$50 00
Unexpended balance Dec. 1, 1917,	–	–	95 53
	$960 00	$1,000 00	$145 53
Disbursements for fiscal year to date,	–	–	19 40
Cash on hand Nov. 30, 1918,	–	–	$126 13

William R. Sessions Fund.

One $500 bond New York Central & Hudson River Railroad stock 6s, at $1,010,	$505 00	$500 00	$30 00
Three United States Liberty Bonds, two at $1,000 and one at $500,	2,500 00	2,500 00	100 00
One bond Toledo Light and Power Company 7s, at	1,000 00	1,000 00	35 00
One bond United Electric Light Company 6s, at	1,000 00	1,000 00	30 00
	$5,005 00	$5,000 00	$195 00
Amherst Savings Bank, deposit,	–	–	101 25
Unexpended balance Dec. 1, 1917,	–	–	275 71
	–	–	$571 96
Disbursements for fiscal year ending Nov. 30, 1918,	–	–	193 85
	–	–	$378 11

SPECIAL FUNDS — *Concluded.*

Alvord Dairy Scholarship Fund.

		Market Value Dec. 1, 1918.	Par Value.	Income.
One United States Liberty Bond 4s, at		$1,000 00	$1,000 00	$40 00
One bond Toledo Light and Power Company 7s, at		1,000 00	1,000 00	35 00
Two bonds United Electric Light Company 6s, at $1,000,		2,000 00	2,000 00	60 00
		$4,000 00	$4,000 00	$135 00
Amherst Savings Bank, deposit,		–	–	90 00
		–	–	$225 00
Overdraft Dec. 1, 1917,	$260 00			
Less amount of receipts,	225 00			
	$35 00			
Extra expense in connection with investment,	8 04			
	$43 04			
Less discount on investment of bonds,	28 34			
Overdraft Nov. 30, 1918,	$14 70			

SUMMARY OF BALANCES ON HAND OF THE INCOME FROM FUNDS HELD IN TRUST BY THE MASSACHUSETTS AGRICULTURAL COLLEGE.

Burnham emergency fund,	$380 55
Endowed labor fund,	76 20
Whiting Street scholarship fund,	342 87
Hills fund,	295 33
Mary Robinson fund,	239 73
Grinnell prize fund,	245 74
Gassett scholarship fund,	263 71
Massachusetts Agricultural College investment fund,	90 45
Danforth Keyes Bangs fund,	1,023 24
John C. Cutter fund,	126 13
William R. Sessions fund,	378 11
	$3,462 06
Alvord dairy scholarship fund overdraft,	14 70
	$3,447 36
W. D. Cowls and J. H. Howard, land,	733 33
	$2,714 03

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1918. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
Auditor.

DEC. 18, 1918.

History of Special Funds.

Burnham emergency fund: —

A bequest of $5,000 from T. O. H. P. Burnham of Boston, made without any conditions. The trustees of the college directed that $1,000 of this fund should be used in the purchase of the Newell land and Goessmann library. The fund now shows an investment of $4,000 00

Library fund: —

The library of the college at the present time contains 58,563 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave $2,000; Jan. 1, 1894, Charles L. Flint gave $1,000; in 1887 Elizur Smith of Lee, Mass., gave $1,315. These were the largest bequests, and now amount to . . . 10,000 00

Endowed labor fund: —

Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students, ... 5,000 00

Whiting Street scholarship fund: —

Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, ... 1,000 00

Hills fund: —

Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden, . 10,000 00

Mary Robinson fund: —

Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship, ... 1,000 00

Grinnell prize fund: —

Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, . . 1,000 00

Gassett scholarship fund: —

Gift of Henry Gassett of Boston, the income to be used for scholarship, ... 1,000 00

Massachusetts Agricultural College investment fund: —

Investment made by vote of trustees in 1893 to purchase one share of New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, ... 100 00

Danforth Keyes Bangs fund: —

Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious and deserving students to obtain an education in said college, ... $6,000 00

John C. Cutter fund: —

Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene, ... 1,000 00

Alvord dairy scholarship fund: —

Gift of Henry E. Alvord, who was the first instructor in military tactics, 1869–71, and a professor of agriculture, 1885–87, at this institution. The income of this fund is to be applied to the support of any worthy student of said college, graduate or postgraduate, who may be making a specialty of the study of dairy husbandry (broadly considered), with the intention of becoming an investigator, teacher or special practitioner in connection with the dairy industry, provided that no benefits arising from such fund shall at any time be applied to any person who then uses tobacco in any form, or fermented or spirituous beverages, or is known to have done so within one year next preceding, ... 4,000 00

William R. Sessions fund: —

In accordance with the request of my deceased wife, Clara Markham Sessions, made in her last will, I bequeath to the trustees of the Massachusetts Agricultural College, Amherst, Mass., the sum of $5,000, it being the amount received by me from the estate of the said Clara Markham Sessions. The said $5,000 to be kept by the said trustees a perpetual fund, the income from which shall be for the use of the Massachusetts Agricultural College; and according to the further request of my deceased wife, made in her last will, this is to be known as the William R. Sessions fund, and is to be a memorial of William R. Sessions; and it is my special request that the said trustees shall make record of the fact that this fund came from the estate of my deceased wife, Clara Markham Sessions, in accordance with her request made in her last will, . . 5,000 00

$49,100 00

FRED C. KENNEY,
Treasurer.

THE M. A. C. BULLETIN

AMHERST, MASS.

Published eight times a year by the Massachusetts Agricultural College.
January, February, March, May, June, September, October, November.

VOLUME XI. MARCH, 1919 NUMBER 3

SIX WEEKS' COURSE IN AGRICULTURE

FOR

Soldiers and Sailors

Offered by the Massachusetts Agricultural College

February 10 - March 22, 1919

GENERAL INFORMATION.

This course is offered to provide an opportunity for men recently discharged from military and naval service to secure some practical instruction in agriculture as a preparation for the farm. Though planned primarily for returning soldiers and sailors, the courses are open to everyone seventeen years of age or over.

Instruction is given by the regular faculty. There are no entrance examinations. Living expenses in Amherst are not over $10 per week. Tuition is free.

Short practical courses pay. They increase one's earning power, not only for the immediate future but for years to come.

The best opportunities in agriculture go to those who are best prepared.

COURSES OFFERED.

Soils and Fertilizers. A knowledge of the soil is essential for all forms of successful agriculture. This knowledge may be had through years of experience or it may be gained more quickly through study and experiment. The course in soils and fertilizers treats of the nature of soils; their properties and management; tillage; drainage; manures, their composition and value, preservation and use; the properties and uses of commercial fertilizers.

Field Crops. Emphasis is placed upon the production of field crops for New England. The course consists of study and practical work in field and laboratory. It deals with species and varieties of field crops, agricultural characteristics, methods of culture, rotation, etc.

Types and Breeds of Live Stock. A course in animal husbandry is of value to everyone engaged in agriculture. All farms keep some animals, and some farms make animal production a specialty. The selection, care and feeding of cattle, horses, sheep and swine forms the basis of the work.

Poultry Husbandry. Poultry raising offers large opportunity for young men. It is a business that can be started on relatively small capital and yields a comparatively quick return. The course deals with poultry house construction, winter egg production, incubation and brooding, feeds and feeding, and marketing poultry and eggs. Demonstrations and as much practical work is given in killing, picking, caponizing, sorting and packing eggs for market, judging fowls for egg production, studying types, and studying construction of incubators and brooders as time permits.

A special vocational course in poultry may be had by students desiring to devote all of their time to the study of poultry problems.

Marketing of Farm Products. The course shows what products New England can most profitably produce and how and when they can best be marketed. The principles or marketing; the importance of marketing as compared with production;

the best outlets for sale; proper methods of preparation, packing, shipping, storing, advertising and selling; direct marketing; use of motor truck; trolley freight and express; collective selling; planning production with a view to marketing; are some of the topics discussed.

Fruit Growing. This course deals with the practical side of the growing and marketing of fruits. Especial attention is given to such questions as site, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing.

Farm Machinery. The purpose of the work offered in farm machinery is to give the student a working knowledge of the selection, care and use of farm machinery. As much work will be offered in gas engines and tractors as time permits.

Dairying. The work offered in dairying is intended to give a practical knowledge of dairy problems. It treats of milk production and testing; the manufacture of dairy products; production and distribution of market milk. The purpose of this course is to present the general problems that the dairy farmer has to meet.

HOW TO REGISTER.

Write JOHN PHELAN, Director of Short Courses, Amherst, Mass., detach and fill in the following, checking subjects which you wish to take.

I hereby apply for admission to the six weeks' course which begins February 10, 1919.

Name_____

Address_____

Reference_____

Soils and Fertilizers	Field Crops	Marketing Farm Products
Poultry Husbandry	Fruit Growing	Farm Machinery
Dairying	Types and Breeds of Live Stock	

SHORT COURSE WORK

AT THE

Massachusetts Agricultural College

Summer Schools

The Summer Schools begin June 30 and continue for four weeks, offering instruction in agriculture, horticulture and related subjects. Special bulletins describing the work of the summer school will be ready for distribution about April 1.

Two-Year Course in Practical Agriculture

This course is designed for young men and women seventeen years of age or over who have at least a common school education. The course as now organized includes two full years of work, including six months of practical farm experience. The term begins September 24. Send for special bulletin.

Ten Weeks' Winter School

This school is intended for young and old who wish to avail themselves of intensive training along agricultural lines. It has proved to be very popular with all who are interested in agriculture. The school begins about the first week of January in each year.

Vocational Courses

These courses are planned for those who wish to specialize in some particular farming interest. The college hopes to offer in the near future several vocational courses that may be taken in a year. One such course is now offered — the course in poultry husbandry. Full information in regard to this course may be had from the college.

THE M. A. C. BULLETIN

AMHERST, MASS.

Vol. XI. No. 4. May, 1919

Published Eight Times a Year by the College

Jan., Feb., Mar., May, June, Sept., Oct., Nov.

Entered as Second-class Mail Matter at the Post Office, Amherst, Mass.

Public Document No. 31

CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE

1918-1919

FIFTY-SIXTH ANNUAL REPORT

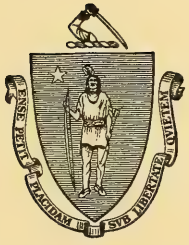
PART II

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE

AMHERST

CATALOGUE, 1918-1919



Publication of this Document
approved by the
Supervisor of Administration.

The Commonwealth of Massachusetts.

Massachusetts Agricultural College,
Amherst, Nov. 30, 1918.

To His Excellency Samuel W. McCall.

Sir: — On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith, to Your Excellency and the Honorable Council, Part II. of the fifty-sixth annual report of the trustees, this being the catalogue of the college.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

The Massachusetts Agricultural College.

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue. Special publication will be made should it become necessary on account of important changes.

CALENDAR.

1918-19-20.

REGULAR COURSES.

1918.

September 25, Wednesday, 1.30 P.M.,	Fall term begins; chapel.
November 27, Wednesday, 12 M.–Friday, November 29, 1 P.M.,	Thanksgiving recess.
December 20, Friday, 5 P.M.,	Fall term closes.
December 30, Monday, 1.30 P.M.,	Winter term begins.

1919.

February 22, Saturday forenoon,	Half holiday — Washington's Birthday.
March 21, Friday, 5 P.M.,	Winter term ends.
March 31, Monday, 1 P.M.,	Spring term begins.
May 30, Friday,	Holiday — Memorial Day.
June 21–24, Saturday–Tuesday,	Commencement.
June 24, Tuesday,	Spring term closes.
June 26–28, Thursday–Saturday,	Entrance examinations.
September 17–20, Wednesday–Saturday,	Entrance examinations.
September 24, Wednesday, 1.30 P.M.,	Fall term begins; chapel.
November 26, Wednesday, 12 M.–Friday, November 28, 1 P.M.,	Thanksgiving recess.
December 19, Friday, 5 P.M.,	Fall term closes.
December 29, Monday, 1 P.M.,	Winter term begins.

1920.

March 19, Friday, 5 P.M.,	Winter term closes.
March 29, Monday, 1 P.M.,	Spring term begins.
June 19–22, Saturday–Tuesday,	Commencement.
June 24–26, Thursday–Saturday,	Entrance examinations.
September 15–18, Wednesday–Saturday,	Entrance examinations.
September 22, Wednesday, 1.30 P.M.,	Fall term begins; chapel.

Massachusetts Agricultural College.

History. — The Massachusetts Agricultural College was organized under the national land grant act of 1862. This legislation is also known as the Morrill act, the original bill having been framed by Justin Smith Morrill, Senator from Vermont, and its final enactment secured under his leadership. It provided that public lands be assigned to the several States and territories, the funds from the sale of which were to be used to establish and maintain colleges of agriculture and mechanic arts. The Massachusetts Agricultural College is among the first of these institutions established. When this act was passed the Massachusetts Institute of Technology was already organized, and the State of Massachusetts definitely decided that the instruction in the mechanic arts should be at the institute, and that the new institution should confine its work to agriculture. On this account the Massachusetts Agricultural College has the unique distinction of being the only separate agricultural college in the country.

In 1863 the State of Massachusetts accepted the provisions of the Morrill act and incorporated the Agricultural College. The location at Amherst was decided only after long and careful study by the original Board of Trustees. The college was formally opened to students on the 2d of October, 1867, with a faculty of four teachers and with four wooden buildings.

The Massachusetts Legislature has granted money for the erection of practically all of the buildings now on the grounds. In view of the fact that the annual income from the original endowment has been only a few thousand dollars, it has been necessary for the State to assume responsibility for the current expenses of the institution.

Organization. — The college is a State institution, and as such is subject to the laws governing and the rules applying to all State departments and institutions. The work of the college is directed by a board of eighteen trustees. Four of these are ex-officio members, — the Governor of the State, the Commissioner of Education, the Commissioner of Agriculture and the president of the college. The other fourteen members are appointed by the Governor for terms of seven years each, or two each year. The immediate control of the institution is vested in the president of the college. The various administrative officers, having supervision of the various departments of activity, are directly responsible to the president.

In carrying out its purpose the college has organized three distinct yet correlated types of work, — namely, research, resident instruction and extension service.

Research. — Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established and supported as a department of the college.

For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the Federal government. In 1906 the Federal government largely increased its support on condition that the money thus provided should be used only for research. The station now receives about two-thirds of its support from the State.

The station is under the direct supervision of the Board of Trustees; the chief officer is the director, who is responsible to the president. It is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of these departments are heads of corresponding departments in the college. The station publishes numerous bulletins and two annual reports, one scientific, the other popular. These publications are free and circulate extensively, the mailing list containing approximately 20,000 addresses.

Resident Instruction. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The chief aim of the institution, through its resident instruction, is to prepare men and women for the agricultural vocations. The term "agricultural vocations" is here used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, floriculture, landscape gardening and forestry. Students are also trained for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for scientific work in chemistry, entomology, botany and microbiology.

Though training for the agricultural vocations is thus the chief concern of the college, students should find the course one that trains them admirably for pursuits in which the sciences are an essential preparation. The course of study aims also to combine an adequate general education with specialized technical and practical training.

Four-year Courses. — Twenty-nine teaching departments offer instruction in agriculture, horticulture, sciences, the humanities, rural social science and rural home making. A system of major courses permits the student to elect major work in one of eighteen departments, and to specialize in it and allied subjects for a period of two years. The degree of bachelor of science is granted on the satisfactory completion of the four years' work of collegiate grade.

Short Courses. — In order to extend the advantages of the institution to those men and women who cannot or do not care to take advantage of the four-year course, various short courses are offered. Chief among these are a two-year course in practical agriculture, a summer school of agriculture and country life, and a winter school of agriculture.

Graduate School. — The graduate school is organized to provide the necessary training for scientific leadership in agriculture and allied sciences. The degrees of master of agriculture, master of landscape architecture, master of science, doctor of agriculture and doctor of philosophy may be earned upon the completion of satisfactory study, research and thesis.

The Extension Service. — The extension service is an organized effort to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, for various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, insofar as the regular teaching and research work will permit, contributes what it can to this work. There is also a regular staff of extension workers whose sole business it is to present the instruction of the college to individuals and various organizations throughout the State, such as extension schools, granges and boards of trade.

Location and Equipment. — The Agricultural College is located in the town of Amherst. The grounds comprise more than 600 acres, lying about a mile north of the village center. The college has also a demonstration forest of 755 acres, located 6 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is 97 miles from Boston, and may be reached by the Central Massachusetts division of the Boston & Maine Railroad, or by the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

Military Drill. — By Federal law military drill is required of all regular students attending the Massachusetts Agricultural College.

THE CORPORATION.

ORGANIZATION OF 1919.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
ARTHUR G. POLLARD of Lowell,	1920
GEORGE H. ELLIS of West Newton,	1920
ELMER D. HOWE of Marlborough,	1921
EDMUND MORTIMER of Grafton,	1921
NATHANIEL I. BOWDITCH of Framingham,	1922
WILLIAM WHEELER of Concord,	1922
CHARLES A. GLEASON of New Braintree,	1923
JAMES F. BACON of Boston,	1923
FRANK GERRETT of Greenfield,	1924
HAROLD L. FROST of Arlington,	1924
CHARLES H. PRESTON of Danvers,	1925
CARLTON D. RICHARDSON of West Brookfield,	1925
DAVIS R. DEWEY of Cambridge,	1926
JOHN F. GANNON of Worcester,	1926

MEMBERS EX OFFICIO.

His Excellency Governor CALVIN COOLIDGE, *President of the Corporation.*
KENYON L. BUTTERFIELD, *President of the College.*
PAYSON SMITH, *State Commissioner of Education.*
WILFRID WHEELER, *State Commissioner of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor CALVIN COOLIDGE of Northampton, *President.*
CHARLES A. GLEASON of New Braintree, *Vice-President.*
RALPH J. WATTS of Amherst, *Secretary.*
FRED C. KENNEY of Amherst, *Treasurer.*
CHARLES A. GLEASON of New Braintree, *Auditor.*

STANDING COMMITTEES OF THE CORPORATION.[1]

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
GEORGE H. ELLIS.
NATHANIEL I. BOWDITCH.
ARTHUR G. POLLARD.
CARLTON D. RICHARDSON.
EDMUND MORTIMER.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
ELMER D. HOWE.
PAYSON SMITH.
DAVIS R. DEWEY.
JOHN F. GANNON.
JAMES F. BACON.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
FRANK GERRETT.
GEORGE H. ELLIS.
EDMUND MORTIMER.
CARLTON D. RICHARDSON.

[1] The president of the college is ex-officio member of each committee.

Committee on Horticulture.

HAROLD L. FROST, *Chairman.*
CHARLES A. GLEASON.
ELMER D. HOWE.
WILFRID WHEELER.
EDMUND MORTIMER.

Committee on Experiment Department.[1]

CHARLES H. PRESTON, *Chairman.*
WILFRID WHEELER.
ARTHUR G. POLLARD.
HAROLD L. FROST.
EDMUND MORTIMER.

Committee on Buildings and Arrangement of Grounds.

FRANK GERRETT, *Chairman.*
WILLIAM WHEELER.
CHARLES H. PRESTON.
GEORGE H. ELLIS.
JAMES F. BACON.

Committee on Extension Service.

ELMER D. HOWE, *Chairman.*
GEORGE H. ELLIS.
HAROLD L. FROST.
DAVIS R. DEWEY.
NATHANIEL I. BOWDITCH.
JOHN F. GANNON.

[1] The director of the experiment station is a member of the committee on experiment department, without vote.

OFFICERS OF THE INSTITUTION.

[The names of the faculty are arranged in groups according to rank. Within these groups the order depends upon seniority of full-time service in the college, not upon seniority of appointment to the position now held. Changes in personnel occurring after Jan. 31, 1919, are not indicated.]

THE FACULTY.

KENYON L. BUTTERFIELD, A.M., L.L.D.,[1] . . . . . President's House.
President of the College and Head of Division of Rural Social Science.

CHARLES H. FERNALD, Ph.D., ... 3 Hallock Street.
Honorary Director of the Graduate School.

EDWARD M. LEWIS, A.M.,[2] . . . . . 19 Lincoln Avenue.
Dean of the College and Professor of Languages and Literature.

FRED C. KENNEY, ... 5 Mount Pleasant.
Treasurer of the College.

——— . . . . . – –
Director of the Experiment Station.

WILLIAM D. HURD, M.Agr., ... 46 Amity Street.
Director of the Extension Service.

CHARLES E. MARSHALL, Ph.D., ... 44 Sunset Avenue.
Director of the Graduate School and Professor of Microbiology.

JOHN PHELAN, A.M., ... 5 Mount Pleasant.
Director of Short Courses and Professor of Rural Sociology.

FRANK A. WAUGH, M.Sc.,[3] . . . . . Campus.
Head of Division of Horticulture and Professor of Landscape Gardening.

JAMES A. FOORD, M.Sc.Agr., ... 54 Lincoln Avenue.
Head of Division of Agriculture and Professor of Farm Management.

ROBERT J. SPRAGUE, Ph.D., ... Mount Pleasant.
Head of Division of the Humanities and Professor of Economics and Sociology.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Goessmann Professor of Chemistry.

CHARLES WELLINGTON, Ph.D., ... 34 Amity Street.
Professor of Chemistry.

JAMES B. PAIGE, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Professor of Veterinary Science.

PHILIP B. HASBROUCK, B.Sc., ... Fearing Street.
Registrar of the College and Professor of Physics.

JOHN E. OSTRANDER, A.M., C.E., ... 33 North Prospect Street.
Professor of Mathematics and Civil Engineering.

HENRY T. FERNALD, Ph.D., ... 44 Amity Street.
Professor of Entomology and Chairman of Division of Science.

A. VINCENT OSMUN, M.Sc., ... 16 Northampton Road.
Professor of Botany.

CLARENCE E. GORDON, Ph.D., ... 38 Lincoln Avenue.
Professor of Zoölogy and Geology.

WILLIAM R. HART, A.M., L.L.B., ... 97 Pleasant Street.
Professor of Agricultural Education.

FRED C. SEARS, M.Sc., ... Mount Pleasant.
Professor of Pomology.

---

[1] On leave of absence from Dec. 1, 1918.
[2] Acting president.
[3] On leave of absence, war service.

William P. B. Lockwood, M.Sc.,[1]	34 North Prospect Street.
Professor of Dairying.	
Alexander E. Cance, Ph.D.,[2]	9 Fearing Street.
Professor of Agricultural Economics.	
Joseph S. Chamberlain, Ph.D.,	Mount Pleasant.
Professor of Organic and Agricultural Chemistry.	
John C. Graham, B.Sc.Agr.,	Lincoln Avenue.
Professor of Poultry Husbandry.	
G. Chester Crampton, Ph.D.,	116 Pleasant Street.
Professor of Insect Morphology.	
Charles A. Peters, Ph.D.,	2 Sunset Avenue.
Professor of Inorganic and Soil Chemistry.	
Curry S. Hicks, B.Pd.,[3]	The Davenport.
Professor of Physical Education and Hygiene.	
William D. Clark, A.B.,M.F.,[4]	Amity Street.
Professor of Forestry.	
Walter W. Chenoweth, A.B.,M.Sc.,	North Amherst.
Professor of Horticultural Manufactures.	
——	– –
Professor of General and Physical Chemistry.	
Christian I. Gunness, B.Sc.,	105 Butterfield Terrace.
Professor of Rural Engineering.	
Harold F. Tompson, B.Sc.,	10 Temple Street, Arlington.
Professor of Market Gardening.	
John C. McNutt, B.Sc.Agr.,	33 East Pleasant Street.
Professor of Animal Husbandry.	
Richard H. Wilson, Colonel, U.S.A.,	The Davenport.
Professor of Military Science and Tactics.	
Edna L. Skinner, B.Sc.,	21 Amity Street.
Professor of Home Economics.	
Ralph J. Watts, B.Sc.,	101 Butterfield Terrace.
Secretary of the College.	
Charles R. Green, B.Agr.,	Mount Pleasant.
Librarian of the College.	
Robert W. Neal, A.M.,	Kendrick Place.
Associate Professor of English.	
Edgar L. Ashley, A.M.,	24 Pleasant Street.
Associate Professor of German.	
Alexander A. Mackimmie, A.M.,	Pine Street, North Amherst.
Associate Professor of French.	
——	– –
Associate Professor of Beekeeping.	
George E. Gage, Ph.D.,[5]	27 Sunset Avenue.
Associate Professor of Animal Pathology.	
William L. Machmer, A.M.,[6]	3 Kendrick Place.
Associate Professor of Mathematics.	
Harold E. Robbins, B.Sc., A.M.,	4 Nutting Avenue.
Associate Professor of Physics.	
Loyal F. Payne, B.Sc.,	12 Chestnut Street.
Associate Professor of Poultry Husbandry.	
Paul J. Anderson, Ph.D.,	McClure Street.
Associate Professor of Botany.	
William S. Regan, Ph.D.,	84 Pleasant Street.
Associate Professor of Entomology.	
Orville A. Jamison, M.Sc.,	7 East Pleasant Street.
Associate Professor of Dairying.	

[1] On leave of absence.
[2] On leave of absence from Feb. 1, 1919.
[3] On leave of absence, war service, until Jan. 7, 1919.
[4] On leave of absence, with New England Fuel Administrator, until Dec. 31, 1918.
[5] On leave of absence, war service.
[6] On leave of absence, United States Department of Agriculture, until Dec. 31, 1918.

ARTHUR B. BEAUMONT, Ph.D., ... 103 Butterfield Terrace.
Associate Professor of Agronomy.
BYRON E. PONTIUS, B.Sc.Agr., ... 5½ East Pleasant Street.
Associate Professor of Animal Husbandry.
ARTHUR L. DACY, B.Sc., ... 5 Allen Street.
Associate Professor of Market Gardening.
ARTHUR K. HARRISON, ... 6 Allen Street.
Assistant Professor of Landscape Gardening.
WALTER E. PRINCE, Ph.B., A.M., ... 4 Kendrick Place.
Assistant Professor of English.
HAROLD M. GORE, B.Sc.,[1] . . . . . The Davenport.
Assistant Professor of Physical Education.
ORTON L. CLARK, B.Sc., ... 16 College Street.
Assistant Professor of Botany.
LORIAN P. JEFFERSON, A.M., ... 84 Pleasant Street.
Assistant Professor in the Division of Rural Social Science.
CHARLES H. THOMPSON, M.Sc., ... Mount Pleasant.
Assistant Professor of Horticulture.
ARAO ITANO, Ph.D., ... 7 East Pleasant Street.
Assistant Professor of Microbiology.
——— . . . . . – –
Assistant Professor of Horticulture.
CHARLES H. PATTERSON, A.B., A.M.,[2] . . . . . 26 Lincoln Avenue.
Assistant Professor of English.
AUGUST G. HECHT, B.Sc.,[3] . . . . . – –
Assistant Professor of Floriculture.
HERBERT P. COOPER, M.Sc., ... 103 Butterfield Terrace.
Assistant Professor of Agronomy.
FRANK C. MOORE, A.B.,[4] . . . . . 30 North Prospect Street.
Assistant Professor of Mathematics.
BROOKS D. DRAIN, B.Sc., ... 24 Pleasant Street.
Assistant Professor of Pomology.
MARGARET HAMLIN, A.B., ... 12 North East Street.
Supervisor of Agricultural Courses for Women.
FRANK W. RANE, M.F., ... Boston.
Lecturer in Forestry.
HELENA T. GOESSMANN, M.Ph., ... Pleasant Street.
Instructor in English.
——— . . . . . – –
Instructor in French.
ARTHUR N. JULIAN, A.B., ... 4 Farview Way.
Instructor in German.
FREDERICK A. MCLAUGHLIN, B.Sc., ... 15 Fearing Street.
Instructor in Botany.
PAUL SEREX, JR., M.Sc., ... 5 East Pleasant Street.
Instructor in Chemistry.
FREDERICK G. MERKLE, M.Sc., ... East Street.
Instructor in Agronomy.
STANLEY E. VANHORN, ... 5 McClellan Street.
Instructor in Dairying.
BURT A. HAZELTINE, B.Sc.,[5] . . . . . – –
Instructor in Mathematics.
FRANK P. RAND, A.M.,[5] . . . . . North Amherst.
Instructor in English.
WALTER M. PEACOCK, M.Sc.Agr., ... 81 Pleasant Street.
Instructor in Farm Management.
——— . . . . . – –
Instructor in Botany.

---

[1] On leave of absence, war service, until Jan. 31, 1919.
[2] Acting dean 1918–19.
[3] On leave of absence, war service, until Jan. 9, 1919.
[4] For one year.
[5] On leave of absence, war service.

HARRY D. DRAIN, B.Sc.Agr.,[1] . . . . . 24 Pleasant Street.
Instructor in Dairying.

——— . . . . . — —
Instructor in Zoölogy.

EGERTON G. HOOD, B.Sc.Agr.,[2] . . . . . — —
Instructor in Microbiology.

DONALD W. SAWTELLE, M.Sc., ... 79 Pleasant Street.
Instructor in Agricultural Economics.

——— . . . . . — —
Field Agent.

LLOYD L. STEWART, B.Sc.Agr.,[2] . . . . . — —
Instructor in Poultry Husbandry.

LUTHER BANTA, B.Sc., ... Lincoln Avenue.
Instructor in Poultry Husbandry.

——— . . . . . — —
Assistant in Physics.

JOSEPH NOVITSKI, ... 6 Phillips Street.
Assistant in Rural Sociology.

THE EXPERIMENT STATION STAFF.

ADMINISTRATION.

FRED W. MORSE, M.Sc., ... 40 Pleasant Street.
Acting Director.

JOSEPH B. LINDSEY, Ph.D., ... 47 Lincoln Avenue.
Vice-Director.

FRED C. KENNEY, ... Mount Pleasant.
Treasurer.

CHARLES R. GREEN, B.Agr., ... Mount Pleasant.
Librarian.

DEPARTMENT OF AGRICULTURAL ECONOMICS.

ALEXANDER E. CANCE, Ph.D.,[3] . . . . . 9 Fearing Street.
In charge of Department.

——— . . . . . — —
Assistant.

DEPARTMENT OF AGRICULTURE.

WILLIAM P. BROOKS, Ph.D., ... 6 Farview Way.
Consulting Agriculturist.

HENRY J. FRANKLIN, Ph.D., ... Wareham.
In charge of Cranberry Investigation.

EDWIN F. GASKILL, B.Sc., ... North Pleasant Street.
Assistant Agriculturist.

ROBERT L. COFFIN, ... 19 Phillips Street.
Assistant.

DEPARTMENT OF BOTANY AND VEGETABLE PATHOLOGY.

A. VINCENT OSMUN, M.Sc., ... 16 Northampton Road.
Botanist.

GEORGE H. CHAPMAN, Ph.D., ... 31 Lincoln Avenue.
Research Physiologist.

PAUL J. ANDERSON, Ph.D., ... McClure Street.
Associate Plant Pathologist.

ORTON L. CLARK, B.Sc., ... 16 College Street.
Assistant Plant Physiologist.

WEBSTER S. KROUT, M.A., ... 46 Pleasant Street.
Field Pathologist.

ALYN S. BALL, ... 124 Main Street.
Assistant.

---

[1] On leave of absence, war service, until Dec. 29, 1918.
[2] On leave of absence, war service.
[3] On leave of absence from Feb. 1, 1919.

Department of Entomology.

Henry T. Fernald, Ph.D., ... 44 Amity Street.
Entomologist.

——— . . . . . – –
Apiarist.

Arthur I. Bourne, A.B., ... 13 East Pleasant Street.
Assistant Entomologist.

——— . . . . . – –
Assistant in Entomology.

Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., ... 47 Lincoln Avenue.
Chemist.

Edward B. Holland, Ph.D., ... 28 North Prospect Street.
Associate Chemist in charge of Research Division.

Fred W. Morse, M.Sc., ... 40 Pleasant Street.
Research Chemist.

Henri D. Haskins, B.Sc., ... 14 Amity Street.
In charge of Fertilizer Division.

Philip H. Smith, M.Sc., ... 102 Main Street.
In charge of Feed and Dairy Division.

Lewell S. Walker, B.Sc., ... 19 Phillips Street.
Assistant Chemist.

Carlton P. Jones, M.Sc., ... 8 Nutting Avenue.
Assistant Chemist.

Carlos L. Beals, M.Sc., ... 10 Nutting Avenue.
Assistant Chemist.

Windom A. Allen, B.Sc.,[1] . . . . . – –
Assistant Chemist.

John B. Smith, B.Sc., ... – –
Assistant Chemist.

Robert S. Scull, B.Sc.,[1] . . . . . – –
Assistant Chemist.

Harold B. Pierce, B.Sc., ... Amity Street.
Assistant Chemist.

Esther S. Mixer, A.B., ... Fearing Street.
Assistant Chemist.

James T. Howard, ... 46 Pleasant Street.
Collector.

Harry L. Allen, ... 89 Main Street.
Assistant.

James R. Alcock, ... North Amherst.
Assistant.

Department of Horticulture.

Frank A. Waugh, M.Sc.,[1] . . . . . Campus.
Horticulturist.

Fred C. Sears, M.Sc., ... Mount Pleasant.
Pomologist.

Jacob K. Shaw, Ph.D.,[2] . . . . . 5 Farview Way.
Research Pomologist.

Department of Meteorology.

John E. Ostrander, A.M., C.E., ... 33 North Prospect Street.
Meteorologist.

---

[1] On leave of absence, war service.
[2] On leave of absence until Feb. 28, 1919.

DEPARTMENT OF MICROBIOLOGY.

CHARLES E. MARSHALL, Ph.D., ... 44 Sunset Avenue.
In charge of Department.
ARAO ITANO, Ph.D., ... 7 East Pleasant Street.
Assistant Professor of Microbiology.

DEPARTMENT OF POULTRY HUSBANDRY.

JOHN C. GRAHAM, B.Sc.Agr., ... Lincoln Avenue.
In charge of Department.
HUBERT D. GOODALE, Ph.D., ... North Amherst.
Research Biologist.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., ... 42 Lincoln Avenue.
Veterinarian.
GEORGE E. GAGE, Ph.D.,[1] . . . . . — —
Associate Professor of Animal Pathology.
JOHN B. LENTZ, V.M.D.,[1] . . . . . — —
Assistant in Veterinary Science.

THE EXTENSION SERVICE STAFF.

WILLIAM D. HURD, M.Agr., ... 46 Amity Street.
Director of Extension Service.
L. WAYNE ARNY, B.Sc., ... 7 Allen Street.
Supervisor of Correspondence Courses and Editor of Extension Service Publications.
STELLA A. BELCHER, B.Sc., ... 16 Nutting Avenue.
Assistant State Leader of Rural Home Economics.
WESLEY H. BRONSON, B.Sc.,[2] . . . . . 12 Nutting Avenue.
Extension Assistant Professor of Farm Management Demonstrations.
LAURA COMSTOCK, ... 84 Pleasant Street.
Extension Professor of Home Economics and State Leader of Rural Home Economics.
E. FARNHAM DAMON, B.Sc.,[3] . . . . . 35 South Pleasant Street.
Extension Associate Professor of Agricultural Economics.
ALBERT L. DEAN,[4] . . . . . 24 Pleasant Street.
Extension Instructor in charge of Poultry Club Work.
WILLIAM L. DORAN, M.Sc., ... 13 Fearing Street.
Pathologist.
——— . . . . . — —
Extension Instructor in Dairying.
GEORGE L. FARLEY, M.Sc., ... Dana Street.
Supervisor of Junior Extension Work.
HENRY R. FRANCIS, B.Sc., ... 10 Allen Street.
Garden Supervisor.
LAURA GIFFORD, ... 16 Nutting Avenue.
Assistant State Leader of Rural Home Economics.
HENRY E. HASLETT, ... Lincoln Avenue.
Specialist in Sheep Husbandry.
ROSWELL W. HENNINGER, B.Sc.,[1] . . . . . — —
Extension Instructor in charge of Poultry Club Work.
WILLIAM F. HOWE, ... 8 North Prospect Street.
Assistant Supervisor, Junior Extension Work.
EARL JONES, M.Sc.Agr., ... 8 Allen Street.
Extension Associate Professor of Agronomy.
AUSTIN D. KILHAM, B.Sc.Agr.,[3] . . . . . — —
Extension Assistant Professor of Pomology.

---

[1] On leave of absence, war service.
[2] On leave of absence, war service, until Jan. 31, 1919.
[3] Resigned.
[4] Temporary appointment.

DANIEL J. LEWIS, B.Sc., ... 7 Phillips Street.
Assistant to the Director.
QUINCY L. LOWRY, B.Sc., ... 15 Fearing Street.
Entomologist.
WILLIAM C. MONAHAN, B.Sc., ... 37 Cottage Street.
Extension Assistant Professor of Poultry Husbandry.
EZRA L. MORGAN, A.M., ... 2 Allen Street.
Extension Professor of Community Planning.
HELEN NORRIS, ... 87 Pleasant Street.
Extension Instructor in Agricultural Education.
SUMNER R. PARKER, B.Sc., ... 51 Amity Street.
State Leader of County Agricultural Projects.
HAROLD D. PHELPS, B.Sc.,[1] . . . . . West Brookfield.
Extension Instructor in Market Gardening.
RALPH W. REDMAN, B.Sc., ... Mount Pleasant.
Assistant Director.
VICTOR A. RICE, B.Sc.Agr., ... Mount Pleasant.
Extension Instructor in charge of Pig Club Work.
FRANK A. C. SMITH, B.Sc.,[2] . . . . . – –
Extension Assistant Professor of Landscape Gardening.
BENJAMIN G. SOUTHWICK, B.Sc., ... 54 Pleasant Street.
Extension Professor of Farm Management Demonstrations.
WILLIAM F. TURNER, B.Sc., ... 37 Cottage Street.
Extension Assistant Professor of Animal Husbandry.
RALPH E. VAN METER, B.Sc.Agr.,[2] . . . . . 24 Pleasant Street.
Extension Instructor in Pomology.
JOHN D. WILLARD, B.A.,[3] . . . . . East Pleasant Street.
Extension Professor of Agricultural Economics.

THE CLERICAL STAFF.

ELEANOR F. BISHOP, ... 3 Spaulding Street.
Bookkeeper, Treasurer's Office.
JOHN K. BROADFOOT, ... 130 Pleasant Street.
Cashier, Treasurer's Office.
RUTH BROOKS, ... 9 Phillips Street.
Clerk, Treasurer's Office.
LENA V. CHAPMAN, ... 77 South Pleasant Street.
Library Assistant.
LUCIA G. CHURCH, ... North Amherst.
First Clerk, Experiment Station.
CASSIE L. CLARK, ... Northampton.
Mailing Clerk, Extension Service.
LOIS E. CLARK, A.B., ... 87 Pleasant Street.
Library Assistant.
RUTH CLOW, ... 73 Pleasant Street.
Clerk, President's Office.
ELSIE H. COOLEY,[4] . . . . . Bank Block.
Stenographer, Extension Service.
LALIA M. DAMON, ... 2 McClellan Street.
Cataloguer, Library.
VIOLA E. DAMON, ... 35 South Pleasant Street.
Clerk, Department of Floriculture.
EMILY G. DAVIDSON, ... Maple Street.
Telephone Operator, Stockbridge Hall.
LOUISE J. DELANO, B.Sc., ... 87 Pleasant Street.
Library Assistant.
LLEWELYN L. DERBY,[2] . . . . . – –
Assistant, Department of Physical Education.
MARION F. DONDALE, A.B., ... 9 Spring Street.
Clerk, Graduate School and Department of Microbiology.

---

[1] Temporary appointment.
[2] On leave of absence, war service.
[3] From Feb. 1, 1919.
[4] From Jan. 1, 1919.

Noella Duval, Clerk, Power Plant.	34 McClellan Street.
Charlotte Erickson,[1] Clerk, Dean's Office.	Florence.
F. Ethel Felton, A.B., Clerk and Editorial Assistant, Experiment Station.	7 Allen Street.
Lina M. Fisher, Clerk, Department of Chemistry.	28 Pleasant Street.
Grace E. Gallond, Clerk, Department of Dairying.	28 Pleasant Street.
Katharine Gardner, A.B., Clerk, Extension Service.	87 Pleasant Street.
Margaret T. Gaskell, Stenographer, Office of the Registrar.	105 Main Street.
Lillian M. Gelinas, Clerk, President's Office.	77 Pleasant Street.
Nettie A. Gilmore, Clerk, Department of Poultry Husbandry.	55 Amity Street.
Cora B. Grover, Clerk, Extension Service.	North Amherst.
Lillian S. Hadfield, Clerk, Extension Service.	16 Nutting Avenue.
Laura M. Hager, A.B., Clerk, Department of Agricultural Economics.	South Deerfield.
Amy L. Hamilton, Stenographer, Division of Rural Social Science.	Savings Bank Block.
Mary G. Hanifin, Clerk, Division of Agriculture.	Maple Street.
Catharine A. Harrington,[2] Stenographer, Extension Service.	62 Main Street.
Mary E. Horton, Clerk, Department of Rural Sociology.	79 Pleasant Street.
Alice M. Howard, First Clerk, Experiment Station.	North Amherst.
Ethel L. Kennedy, Clerk, Extension Service.	8 Allen Street.
Elizabeth M. Kiley, Clerk, Department of Entomology.	Northampton.
Carleton D. Livermore, Chief Clerk, Extension Service.	44 Triangle Street.
Helen A. Martin, Clerk, Treasurer's Office.	5 Phillips Street.
Irene A. Martin, Stenographer, Treasurer's Office.	5 Phillips Street.
Rebecca L. Mellor, Clerk, Experiment Station.	10 Kellogg Avenue.
Gladys I. Miner, Clerk, Extension Service.	73 Pleasant Street.
Bridie E. O'Donnell, Clerk, Department of Entomology.	Hadley.
Hazel Parker, Clerk, Treasurer's Office.	North Amherst.
Helen L. Phillips, Clerk, Extension Service.	13 Amity Street.
Frances Powers, Stenographer, Department of Dairying.	44 Lincoln Avenue.
Edith Robinson, Clerk, President's Office.	Sunderland.
Ruby Sanborn, A.B., Clerk, Department of Poultry Husbandry.	45 Pleasant Street.
Mary I. Shores, Clerk, Dean's Office.	35 South Pleasant Street.

[1] From Dec. 23, 1918.

[2] From Jan. 1, 1919.

ELIZABETH STRACHAN, ... 17 High Street.
Clerk, Treasurer's Office.
ETHELYN STREETER, ... 55 Amity Street.
Clerk, Division of Horticulture.
MARJORIE SULLIVAN, ... 55 Amity Street.
Clerk, Division of Agriculture.
ALINE B. SURPRENANT,[1] . . . . . 44 Triangle Street.
Clerk, Extension Service.
CLARA A. SWIFT, ... North Amherst.
Stenographer, Extension Service.
DORIS TOWER, ... 55 Amity Street.
Stenographer, Department of Poultry Husbandry.
OLIVE M. TURNER, B.Sc., ... 22 Spaulding Street.
Clerk, Registrar's Office.
MARION L. WARNER, ... 41 Lincoln Avenue.
First Clerk, Division of Agriculture.
ELLEN L. WELCH, A.B., ... Hadley.
Clerk, Department of Botany.
AURELIA B. WENTWORTH,[2] . . . . . South Amherst.
First Clerk, Division of Agriculture.
MAE HOLDEN WHEELER, B.Sc., ... 22 North Prospect Street.
Curator, Department of Botany.

STAFF OF OPERATING AND MAINTENANCE.

THOMAS F. BUTTERWORTH, ... 3 Phillips Street.
Engineer.
LAWRENCE S. DICKINSON, B.Sc., ... 2 Farview Way.
Superintendent of Grounds.
LULU DIETHER, ... Draper Hall.
Manager of the Dining Hall.
CLARENCE A. JEWETT, ... 112 Pleasant Street.
Superintendent of Buildings.
JOHN J. LEE, ... 38 Cottage Street.
Assistant to the Military Detail.
ENOS J. MONTAGUE, B.Sc.,[3] . . . . . Campus.
Farm Superintendent.
ELIZABETH OLMSTEAD, ... Infirmary.
Resident Nurse.
GEORGE F. PUSHEE, ... North Amherst.
Shop Assistant, Rural Engineering.
JAMES WHITING, ... 16 Hallock Street.
Foreman, Department of Floriculture.

GRADUATE ASSISTANTS.

THOMAS B. GORDON, B.Sc.Agr.,[4] . . . . . 24 Pleasant Street.
Department of Agronomy.
LINUS H. JONES, B.Sc., ... Clark Hall.
Department of Chemistry.
ARTHUR L. PRINCE, A.B., ... 24 Pleasant Street.
Department of Chemistry.
SATWAJI G. MUTKEKAR, M.Sc., ... Campus.
Department of Microbiology.
JAMES M. NEILL, B.Sc., ... 15 Phillips Street.
Department of Microbiology.
HAROLD L. SULLIVAN, B.Sc.,[5] . . . . . 15 Phillips Street.
Department of Microbiology.
ALFRED S. MALLOREY, B.Sc.,[6] . . . . . 15 Hallock Street.
Department of Agronomy.

---

[1] From Nov. 11, 1918.
[2] Resigned.
[3] From Dec. 15, 1918.
[4] To Dec. 31, 1918.
[5] To Nov. 16, 1918.
[6] From Jan. 1, 1919.

Standing Committees of the Faculty.

1918-19.

Catalogue and Other Publications.

Associate Professor Neal.
Secretary Watts.

Commencement.

Dean Lewis.
Treasurer Kenney.
Colonel Wilson.
Professor Peters.
Secretary Watts.
Associate Professor Robbins.
Assistant Professor Hecht.

Course of Study.

Dean Lewis.
Professor Hart.
Professor Sears.
Professor Foord.
Professor Sprague.
Professor Fernald.
Professor Ostrander.
Professor Marshall.
Professor Chamberlain.
Professor Chenoweth.
Professor Phelan.

Discipline (Advisory).

Dean Lewis.
Registrar Hasbrouck.
Assistant Professor Patterson.
Professor Hicks.
Professor Phelan.
Professor Gunness.

Employment.

Professor Sears.
Treasurer Kenney.
Secretary Watts.
Professor McNutt.

Entrance Examinations and Admission.

Registrar Hasbrouck.
Acting Dean Patterson.
Professor Osmun.
Associate Professor Ashley.

HEALTH AND SANITATION.

Professor MARSHALL.
Treasurer KENNEY.
Colonel WILSON.
Miss COMSTOCK.

LIBRARY.

Professor MARSHALL.
Professor SPRAGUE.
Professor GUNNESS.
Mr. GREEN.

SCHEDULE.

Professor PETERS.
Mr. JULIAN.

SCHOLARSHIP.

Acting Dean PATTERSON.
Registrar HASBROUCK.
Professor CHAMBERLAIN.
Professor PHELAN.
Associate Professor MACKIMMIE.
Associate Professor ROBBINS.
Associate Professor MACHMER.

STUDENT LIFE.

Assistant Professor PATTERSON.
Associate Professor ROBBINS.
Secretary WATTS.

UNCLASSIFIED STUDENTS.

Acting Dean PATTERSON.
Professor SEARS.
Professor HASBROUCK.
Professor FOORD.

The College.

ADMISSION.

A. Application for Admission.

All correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before examination is desired. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. Modes of Admission.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

Certificates. — Certificates will be received from those schools in New England which have been approved by the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present at least three of the necessary fourteen credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

Examinations. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June, ...	Amherst, Department of Physics building. Massachusetts Institute of Technology, Cambridge, Mass. Worcester, Horticultural Hall.
In September, ...	Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 26-28, inclusive, 1919. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M.	Registration.
8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Second Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra.
2.00 P.M.	History, required and elective.

Third Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1919, the examinations will be given September 17-20, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M.	Registration.
1.15-5.00 P.M.	Greek A and B.

Second Day.

8.00 A.M.	Plane geometry.
10.00 A.M.	Chemistry.
11.30 A.M.	Botany.
2.00 P.M.	Solid geometry.
4.00 P.M.	Physics.

Third Day.

8.00 A.M.	Required English.
11.00 A.M.	Algebra, agriculture.
2.00 P.M.	History, required and elective.

Fourth Day.

8.00 A.M.	French, German, required and elective.
1.00 P.M.	Latin A and B and all one-half credit electives, except those already noted.

C. Requirements for Admission.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year. **Neither more nor less credit will be given in any subject than is indicated in the table below.** Fourteen units must be offered for admission. In the list given below, *every subject in black-faced type is prescribed and no substitution is allowed.* The subjects so typed total eight and one-half units. In addition to these points five and one-half more units must be chosen from the subjects printed in light-faced type. Not more than four half-credit units may be offered. No applicant deficient in both algebra and plane geometry will be admitted.

Agriculture,[1]	1 to 4*
Botany,[2]	½ or 1
Chemistry,[2]	1
Algebra,	1½
Plane geometry,	1
Solid geometry,	½
Trigonometry,	½
Physics,[2]	1
Geology,	½
Physiography,	½
Physiology,	½
Zoölogy,[2]	½
History[3] (Ancient; Medieval and Modern; English; General; United States and Civics), *any one,*	1[4]
English 1,	1½
English 2,	1½
Modern Language (elementary French or elementary German),	2
Elementary French,[5]	2
Elementary German,[5]	2
Intermediate French,	1
Advanced French,	1
Intermediate German,	1
Advanced German,	1
Greek A,[1]	2
Greek B,[1]	1
Latin A,	2
Latin B,	1
Commercial geography,[6]	½
Drawing,[6]	½
Manual training,[6]	½ or 1

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 2, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books, but their certificates must state that note-books have been satisfactorily completed.

* **See page 30 for details.**

---

[1] Examination in September only.

[2] Note-book required as part of preparation will be credited as part of the examination.

[3] One must be offered for the required point; one, two or three others may be offered for elective points.

[4] For each offered.

[5] May be offered as elective if not offered to satisfy *prescribed* points.

[6] On certificate only, no examination given.

D. Statement of Preparation Required for Admission.

Agriculture. — Entrance credit in agriculture is granted on the following basis: —

1. In schools offering a regular course in agriculture as a part of the curriculum which is accepted as credit for high school graduation, 1 to 3 credits, as determined by the head of the Division of Agriculture of the college.

2. In high schools organizing agricultural club work under the supervision and rules of the junior extension service of the college, 1 credit is granted for each full year of work performed under the following plan: —

Work of the Winter Term. — (*a*) The study of text-books such as are suitable for secondary school instruction in agriculture.

(*b*) Course of Study: A general outline of suggested topics for study.

(*c*) Visits by a representative of the Massachusetts Agricultural College for observation, counsel and advice in regard to kind and amount of work being done in agriculture.

(*d*) Formation of an agricultural club with officers from among its own members, meeting once a month under local supervision of some one authorized to act for the school authorities.

Work of the Spring Term. — Same in general form as winter term.

Work of the Summer Term. — An approved project conforming to the rules of some one or more of the agricultural clubs of the junior extension service of the Massachusetts Agricultural College.

Work of the Fall Term. — (*a*) An exhibit of work.

(*b*) Reports and story of achievement submitted to the junior extension service of the college.

The maximum number of credits in agriculture is 4. The examinations in agriculture are given in September only.

Botany. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Steven's "Introduction to Botany" and Bergen & Davis's "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements. The keeping of a note-book is required.

Mathematics. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical

and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynominals and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binominal theorem for positive integral exponents, the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

Physics. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both class-room work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Text-book of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

Physiology. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

Zoölogy, Physiography, Geology. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy." For geology, A. P. Brigham's "A Text-book of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will

be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

History. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

English. — The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the

books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.: —

Group I. Classics in Translation: The "Old Testament," comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther; the "Odyssey," with the omission, if desired, of Books I., II., III., IV., V., XV., XVI., XVII.; the "Iliad," with the omission, if desired, of Books XI., XIII., XIV., XV., XVIII., XXI.; the "Æneid." The "Odyssey," "Iliad" and "Æneid" should be read in English translations of recognized literary excellence.

For any one selection from Group I. a selection from any other group may be substituted.

Group II. Shakspere: "Midsummer Night's Dream;" "Merchant of Venice;" "As You Like It;" "Twelfth Night;" "The Tempest;" "Romeo and Juliet;" "King John;" "Richard II.;" "Richard III.;" "Henry V.;" "Coriolanus;" "Julius Cæsar;"[1] "Macbeth;"[1] "Hamlet."[1]

Group III. Prose Fiction: Malory's "Morte d'Arthur" (about 100 pages); Bunyan's "Pilgrim's Progress," Part I.; Swift's "Gulliver's Travels" (voyages to Lilliput and to Brobdingnag); Defoe's "Robinson Crusoe," Part I.; Goldsmith's "Vicar of Wakefield;" Frances Burney's "Evelina;" Scott's novels, any *one;* Jane Austen's novels, any *one;* Maria Edgeworth's "Castle Rackrent" or "The Absentee;" Dickens' novels, any *one;* Thackeray's novels, any *one;* George Eliot's novels, any *one;* Mrs. Gaskell's "Cranford;" Kingsley's "Westward Ho!" or "Hereward the Wake;" Reade's "The Cloister and the Hearth;" Blackmore's "Lorna Doone;" Hughes's "Tom Brown's School Days;" Stevenson's "Treasure Island" or "Kidnapped" or "Master of Ballantrae;" Cooper's novels, any *one;* Poe's "Selected Tales;" Hawthorne's "The House of the Seven Gables" or "Twice Told Tales" or "Mosses from an Old Manse;" a collection of short stories by various standard writers.

Group IV. Essays, Biography, etc.: Addison and Steele's "The Sir Roger de Coverley Papers" or selections from the "Tatler" and "Spectator" (about 200 pages); selections from Boswell's "Life of Johnson" (about 200 pages); Franklin's "Autobiography;" selections from Irving's "Sketch Book" (about 200 pages) or "Life of Goldsmith;" Southey's "Life of Nelson;" selections from Lamb's "Essays of Elia" (about 100 pages); selections from Lockhart's "Life of Scott" (about 200 pages); Thackeray's "Lectures on Swift, Addison and Steele in the English Humorists;" Macaulay: any one of the following essays: "Lord Clive," "Warren Hastings," "Milton," "Addison," "Goldsmith," "Frederic the Great," "Madame d'Arblay;" selections from Trevelyan's "Life of Macaulay" (about 200 pages); Ruskin's "Sesame and Lilies" or "Selections" (about 150 pages); Dana's "Two Years Before the Mast;" Lincoln's "Selections," including at least the two inaugurals, the speeches in Independence Hall and at Gettysburg, the last public address, the letter to Horace Greeley, together with a brief memoir or estimate of Lincoln; Parkman's "The Oregon Trail;" Thoreau's "Walden;" Lowell's "Selected Essays" (about 150 pages); Holmes's "The Autocrat of the Breakfast Table;" Stevenson's "An Inland Voyage" and "Travels with a Donkey;" Huxley's

[1] If not chosen for study under B.

"Autobiography" and selections from "Lay Sermons," including the addresses on "Improving Natural Knowledge," "A Liberal Education" and "A Piece of Chalk;" a collection of "Essays" by Bacon, Lamb, De Quincey, Hazlitt, Emerson and later writers; a collection of "Letters" by various standard writers.

Group V. Poetry: Palgrave's "Golden Treasury" (first series), Books II. and III., with special attention to Dryden, Collins, Gray, Cowper and Burns; Palgrave's "Golden Treasury (first series), Book IV., with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B); Goldsmith's "The Traveller" and "The Deserted Village;" Pope's "The Rape of the Lock;" a collection of English and Scottish ballads, as, for example, some "Robin Hood" ballads, "The Battle of Otterburn," "King Estmere," "Young Beichan," "Bewick and Grahame," "Sir Patrick Spens" and a selection from later ballads; Coleridge's "The Ancient Mariner," "Christabel" and "Kubla Khan;" Byron's "Childe Harold," Canto III. or IV., and "The Prisoner of Chillon;" Scott's "The Lady of the Lake" or "Marmion;" Macaulay's "The Lays of Ancient Rome," "The Battle of Naseby," "The Armada," "Ivry;" Tennyson's "The Princess" or "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur;" Browning's "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Lost Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus;" Arnold's "Sohrab and Rustum" and "The Forsaken Merman;" selections from American poetry, with special attention to Poe, Lowell, Longfellow and Whittier.

B. Study. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. Drama: Shakspere's "Julius Cæsar," "Macbeth," "Hamlet."

Group II. Poetry: Milton's "L'Allegro," "Il Penseroso" and either "Comus" or "Lycidas;" Tennyson's "The Coming of Arthur," "The Holy Grail" and "The Passing of Arthur;" the selections from Wordsworth, Keats and Shelley in Book IV. of Palgrave's "Golden Treasury" (first series).

Group III. Oratory: Burke's "Speech on Conciliation with America;" Macaulay's "Speech on Copyright" and Lincoln's "Speech at Cooper Union;" Washington's "Farewell Address" and Webster's "First Bunker Hill Oration."

Group IV. Essays: Carlyle's "Essay on Burns," with a selection from Burns's "Poems;" Macaulay's "Life of Johnson;" Emerson's "Essay on Manners."

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a

sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

French. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

German. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows. **(The examination in Greek A and Greek B will be given in September only.)**

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from

the first four books of Xenophon's "Anabasis," and (*b*) the translation of passages of Attic prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages from the first six books of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the form and constructions of the passages.

Latin. — Latin will receive credit as an elective requirement upon either examination or certification, as follows: —

A. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (*b*) the translation of passages of Latin prose at sight.

B. A third credit unit will be allowed if, in addition to the above, satisfactory proficiency be shown in (*a*) the translation of a passage or passages selected from either Books I. to VI. of Virgil's "Æneid," or six orations of Cicero, including those against Catiline; and (*b*) the translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," Books I. to IV.

Commercial Geography.[1] — Preparation should be made in a course equivalent to that laid down in Adams' "Commercial Geography," Trotter's "Geography of Commerce," or a similar work. (No examination given.)

Drawing.[1] — The applicant may offer either freehand or mechanical drawing or both. He must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable him to draw correctly a simple geometric model from memory; or, if he present mechanical drawing, he must have working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented, see "Manual Training." (No examination given.)

Manual Training.[1] — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

E. Admission to Advanced Standing.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.

2. A statement or certificate of his entrance record.

[1] On certificate only; no examination given.

3. A statement from the proper officer showing a complete record of his work while in attendance.

4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. Candidates must receive credit for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. Not more than five and one-half credits from the elective group will be accepted. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of $5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses see "Short Courses."

G. Unclassified Students.

All requests for information concerning admission of unclassified students should be addressed to Dean Edward M. Lewis, chairman of committee on unclassified students.

Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

1. All unclassified students are subject to the supervision of a special committee.

2. No applicant under eighteen years of age will be admitted as an unclassified student.

3. No entrance examination is required, but applicants must bring certificates showing that they have finished a four-year high school course or its equivalent, or that they are graduates of a county agricultural school of Massachusetts, and furnish satisfactory testimonials as to moral character.

4. No student of this or any other institution who has not done efficient work therein shall be permitted to register as an unclassified student.

5. Each unclassified student must take from the regular technical elective courses, and necessary prerequisites, a minimum of twelve credit hours a week.

6. In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

7. Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 60 per cent. An unclassified student who passes in less than 60 per cent. of his work will be dropped from college.

8. Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than six terms without the special permission of the faculty.

9. No unclassified student shall be allowed to participate in any intercollegiate contests.

10. Unclassified students are subject to the general regulations applying to classified students.

11. Every unclassified student should clearly understand that before any application for transfer to the regular registration for the Bachelor of Science degree will be considered by the registrar, he must present all entrance credits either by certificate or by examination in the same way as is required of a student who enters regularly.

Courses of Instruction.

TABLE OF FRESHMAN AND SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

Freshman Year.

First Term.

All work required.

Subject.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 1 or 4,	3
Algebra,	Mathematics 1,	5
Language,	French or German 1 or 4,	3
English,	English 1,	3
Agriculture,	Agronomy 1,	3
Tactics,	Military 1,	1
Drill,	Military 4,	1
Hygiene,	Physical Education 1,	1
Public speaking,	Public Speaking 1 (one-third of the class),	1
		21

College life (attendance without credit).

Second Term.

Chemistry,	Chemistry 2 or 5,	3
Algebra,	Mathematics 2,	2
Trigonometry,	Mathematics 5,	3
Language,	French or German 2 or 5,	3
English,	English 2,	3
Agriculture,	Agronomy 1, Animal Husbandry 1,	3
Tactics,	Military 2,	1
Drill,	Military 5,	1
Geology,	Geology 2,	2
Public speaking,	Public Speaking 1 (one-third of class),	1
		22

College life (attendance without credit).

Freshman Year — *Concluded.*

Third Term.

Subject.	Courses and Numbers.	Credit Hours per Week.
Chemistry,	Chemistry 3 or 6,	3
Solid geometry,	Mathematics 3,	3
Mensuration,	Mathematics 6,	2
Language,	French or German 3 or 6,	3
English,	English 3,	3
Botany,	Botany 3,	3
Tactics,	Military 3,	1
Drill,	Military 6,	1
Recreation,	Physical Education 3,	1
Public speaking,	Public Speaking 1 (one-third of class),	1
		21

College life (attendance without credit).

Sophomore Year.

First Term.

Subject.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Required.				
Physics,	25	3	1	4
Zoölogy,	25	2	2	4
Botany,	25	1	2	3
English,	25	2	–	2
Military,	25	1	–	1
Military,	28	–	2	1
Total required,	–	–	–	15
Elective.				
Chemistry,	25	1	2	3
French,	25 or 28	3	–	3
German,	25 or 28	3	–	3
Drawing,	25	–	3	3
Animal husbandry,	25	2	1	3
Rural engineering,	25	–	2	2

Minimum credit for first term, 18.
Maximum credit for first term, 21.

Sophomore Year — *Concluded.*

Second Term.

Subject.	Course Number.	Class Hours.	Two Hour Laboratory Periods.	Credit Hours per Week.
Required.				
Physics,	26	2	1	3
Agricultural economics,	26	5	–	5
English,	26	2	–	2
Military,	26	1	–	1
Military,	29	–	2	1
	–	–	–	12
Elective.				
Chemistry,	26	1	2	3
French,	26 or 29	3	–	3
German,	26 or 29	3	–	3
Mathematics,	26	2	–	2
Drawing,	26	–	3	3
Entomology,	26	3	–	3
Animal husbandry,	26	2	1	3
Rural engineering,	26	–	2	2
Botany,	26	1	2	3
Economic sociology,	26	5	–	5

Minimum credit for second term, 18.
Maximum credit for second term, 20.

Third Term.

Required.				
Rural sociology,	27	3	–	3
Agronomy,	27	4	1	5
English,	27	2	–	2
Military,	27	1	–	1
Military,	30	–	2	1
Physical education,[1]	26	–	1	1
Total required,	–	–	–	13
Elective.				
Chemistry,	27	1	4	5
Chemistry,	30	3	2	5
French,	27 or 30	3	–	3
German,	27 or 30	3	–	3
Mathematics,	27	–	3	3
Drawing,	27	–	3	3
Entomology,	27	–	2	2
Geology,	27	3	2	5
Physics,	27	4	1	5
Horticulture,	27	2	1	3
Zoölogy,	27	1	2	3

[1] Credit for Physical Education 2 and 3 given in third term.

Minimum credit for third term, 19.
Maximum credit for third term, 22.

MAJORS: JUNIOR AND SENIOR YEARS.

General Statement.

A major consists of 45 credit hours of correlated work, to be arranged by the student and an instructor called the adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

Rules governing Majors.

Rule 1. *Election.* — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

Rule 2. *Minimum Credits.* — The minimum number of credits for graduation shall be 237 credit hours, inclusive of military drill and physical education.

Rule 3. *Maximum Credits.* — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

Rule 4. *Humanities and Rural Social Science.* — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions.

Rule 5. *Advisers.* — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student intends to elect his major. Each student should consult with the adviser as soon as possible. The adviser has full authority to prescribe the student's work up to 45 hours. It is understood, however, that so far as practicable the individual needs of the student will be recognized. It is also hoped and expected that students will be disposed to seek the counsel of the adviser with respect to the remaining courses required for graduation.

Rule 6. *Free Electives.* — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

Rule 7. *Registration.* — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the registrar's office three weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his college address, the name of parent or guardian, and the student's home address. When the major courses have been entered on this card, and the hours

of free elections added by the student, the card must be returned to the registrar one week before the beginning of the final examination period.

Rule 8. *Changes.* — Applications for changes may be made to the dean in writing at any time; when approved by him and by the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

Agriculture. (Major.)

Professor James A. Foord, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Animal Husbandry 25,	3	Agronomy 50,	5	Animal Husbandry 75,	3
Agronomy,	76 III.	5		Rural Engineering 25,	2	Dairying 50,	5	Rural Engineering 75,	5
Animal Husbandry,	51 III.	3						Farm Management 75,	3
Animal Husbandry,	75 I.	3	II.	Mathematics 26,	2			Animal Husbandry 76,	3
Animal Husbandry,	76 II.	3		Animal Husbandry 26,	3				
Dairying,	50 I.	5		Rural Engineering 26,	2				
Farm Management,	75 II.	3	III.	Chemistry 30,	5	Microbiology 50,	5	Agronomy 76,	5
Farm Management,	76 III.	5		Mathematics 27,	3	Animal Husbandry 51,	3	Farm Management 76,	5
Microbiology,	50 I.			Horticulture 27,	3				
or		5							
Microbiology,	50 III.		IV.						
Rural Engineering,	75 I.	5							
		42							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Rural Engineering (shop work) 25 and 26, Chemistry 30, Mathematics 26 and 27, and Horticulture 27.

Additional Information. — Dairying 75, Pomology 50 and 51, Rural Engineering 78, and Veterinary 51 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

Agronomy. (Major.)

Associate Professor Arthur B. Beaumont, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 I.	5	I.	Chemistry 25,	3	Agronomy 50,	5	Agronomy 75,	5
Agronomy,	51 III.	5		German 25 or 28,	3	Chemistry 51,	8	Animal Husbandry 75,	3
Agronomy,	75 I.	5							
Agronomy,	77 II.	5	II.	Botany 26,	3	Chemistry 52,	8	Agronomy 77,	5
Animal Husbandry.	75 I.	3		Chemistry 26,	3				
Chemistry,	51 I.	8		German 26 or 29,	3				
				Mathematics 26,	2				
Chemistry,	52 II.	8	III.	German 27 or 30,	3	Agronomy 51,	5	Farm Management 76,	5
Farm Management,	76 III.	5		Mathematics 27,	3				
				Geology 27,	5				
		44							
			IV.						

Sophomore Elective Prerequisites (Required). — Chemistry 25 and 26, German 25 or 28, 26 or 29, 27 or 30, Geology 27, Botany 26.
Advised. — Mathematics 26 and 27.

Animal Husbandry. (Major.)

Professor John C. McNutt, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	50 **I.**	5	**I.**	Animal Husbandry 25,	3	Agronomy 50,	5	Animal Husbandry 75,	3
Animal Husbandry,	51 **III.**	3				Veterinary 50,	5	Farm Management 75,	3
Animal Husbandry,	50 **II.**	1				Dairying 50,	5		
Animal Husbandry,	52 **III.**	3	**II.**	Animal Husbandry 26,	3	Animal Husbandry 50,	3	Animal Husbandry 76,	3
Animal Husbandry,	75 **I.**	3						Animal Husbandry 78,	3
Animal Husbandry,	76 **II.**	3							
Animal Husbandry,	77 **III.**	3	**III.**	Chemistry 30,	5	Animal Husbandry 51,	3	Animal Husbandry 80,	1
Animal Husbandry,	78 **II.**	3				Animal Husbandry 52,	3	Animal Husbandry 77,	3
Animal Husbandry,	80 **III.**	1						Farm Management 76,	5
Dairying,	50 **I.**	5	**IV.**						
Farm Management,	75 **II.**	3							
Farm Management,	76 **III.**	5							
Veterinary,	50 **I.**	5							
		43							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Chemistry 30.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Dairying. (Major.)

Professor William P. B. Lockwood, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Animal Husbandry,	52 **III.**	3	**I.**	Animal Husbandry 25,	3	Dairying 50,	5	Animal Husbandry 75,	3
Animal Husbandry,	75 **I.**	3		Rural Engineering 25,	2	Microbiology 50,	5	Microbiology 82,	5
Animal Husbandry,	76 **II.**	3						Farm Management 75,	3
Dairying,	50 **I.**	5	**II.**	Animal Husbandry 26,	3	Rural Engineering 77,	5	Animal Husbandry 76,	3
Dairying,	51 **III.**	5		Rural Engineering 26,	2	Microbiology 51,	5	Dairying 75,	5
Dairying,	75 **II.**	5				(Prerequisite to 82.)			
Dairying,	76 **III.**	5	**III.**	Chemistry 30,	5	Animal Husbandry 52,	3	Dairying 76,	5
Farm Management,	75 **II.**	3				Dairying 51,	5		
Microbiology,	50 **I.**	5							
Microbiology,	82 **I.**	5							
Rural Engineering,	77 **II.**	5	**IV.**						
		47							

Sophomore Elective Prerequisites (Required). — Animal Husbandry 25 and 26, Rural Engineering 25 and 26, Chemistry 30.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Poultry Husbandry. (Major.)

Professor John C. Graham, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	75 **I.**	5	**I.**			Poultry 50,	3	Poultry 76,	5
Animal Husbandry,	51 **III.**	3				Poultry 51,	2	Poultry 77,	5
Poultry Husbandry,	50 **I.**	3				Agricultural Economics 75,	5	Pomology 50,	3
Poultry Husbandry,	51 **I.**	2	**II.**			Poultry 52,	3	Poultry 75,	5
Poultry Husbandry,	52 **II.**	3						Veterinary 86,	3
Poultry Husbandry,	53 **III.**	5						Poultry 55,	1-5
Poultry Husbandry,	55	1-5							
Poultry Husbandry,	54 **III.**	2	**III.**			Poultry 53,	5		
Poultry Husbandry,	75 **II.**	5				Poultry 54,	2		
Poultry Husbandry	76 **I.**	5				Animal Husbandry 51,	5		
Poultry Husbandry,	77 **I.**	5	**IV.**						
Pomology,	50 **I.**	3							
Veterinary Science,	86 **II.**	3							
		45-49							

Sophomore Recommendations. — Students intending to major in Poultry Husbandry are urged to take Zoölogy 27.

Advised. — Juniors who did not take Zoölogy 27 as sophomores are strongly advised to include it in their program.

Floriculture.

Assistant Professor August G. Hecht, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	2	**I.**	Drawing 25,	3	Floriculture 50,	4	Floriculture 75,	3
Botany,	51 **II.**	2				Floriculture 53,	3	Horticulture 50,	5
Entomology,	26 **II.**	3				Botany 50,	2		
Floriculture,	50 **I.**	4	**II.**	Drawing 26,	3	Floriculture 51,	4	Floriculture 77,	3
Floriculture,	51 **II.**	4		Entomology 26,	3	Floriculture 54,	3	Floriculture 76,	3
Floriculture,	52 **III.**	4		Botany 26,	3	Entomology 26,	5		
						Botany 51,	2		
Floriculture,	53 **I.**	3	**III.**	Drawing 27,	3	Floriculture 52,	4	Floriculture 80,	3
Floriculture,	54 **II.**	3		Entomology 27,	2	Floriculture 78,	3	Horticulture 51,	5
Floriculture,	75 **I.**	3		Horticulture 27,	3				
Floriculture,	76 **II.**	3							
Floriculture,	77 **II.**	3	**IV.**						
Floriculture,	78 **III.**	3							
Floriculture,	80 **III.**	3							
Horticulture,	50 **I.**	5							
Horticulture,	51 **III.**	5							
		50							

Sophomore Elective Prerequisites. — Drawing 25, 26 and 27, Entomology 26 and 27, Botany 26 and Horticulture 27.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose. Horticulture 50 and 51 will be taken by seniors.

Advised. — The department advises all students who major in this subject to take Botany 78 and Landscape Gardening 75.

Forestry. (Major.)

Professor William D. Clark, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 I.	2	I.	Drawing 25,	3	Forestry 50,	3	Forestry 75,	5
Botany,	50 II.	2		Rural Engineering 25,	2	Landscape Gardening 50,	5		
Entomology,	75 III.	4				Horticulture 50,	5		
						Botany 50,	2		
Forestry,	50 I.	3	II.	Drawing 26,	3	Forestry 51,	3		
Forestry,	51 II.	3		Mathematics 26,	2	Botany 51,	2		
Forestry,	53 III.	3		Entomology 26,	3	Landscape Gardening 51,	4		
Forestry,	54 IV.	5		Botany 26,	3				
Forestry,	75 I.	5	III.	Drawing 27,	3	Forestry 53,	3	Forestry 78,	3
Forestry,	78 III.	3		Mathematics 27,	2	Horticulture 51,	5		
Horticulture,	50 I.	5		Entomology 27,	3	Entomology 75,	4		
				Horticulture 27,	3				
Horticulture,	51 III.	5	IV.			Landscape Gardening 53,	5		
Landscape Gardening,	50 I.	5				Forestry 54,	5		
Landscape Gardening,	51 II.	4							
		49							

Sophomore Elective Prerequisites (Required). — Drawing 25, 26 and 27, Rural Engineering 25, Mathematics 26 and 27, Entomology 26 and 27, Botany 26, Horticulture 27.

Additional Information. — Substitutions according to individual needs may be made in conference with the adviser.

Landscape Gardening. (Major.)

Professor Frank A. Waugh, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Floriculture,	78 **III.**	3	**I.**	Drawing 25,	3	Landscape Gardening 50,	5	Landscape Gardening 75,	3
Horticulture,	50 **I.**	5				Horticulture 50,	5	Landscape Gardening 53, (when not taken in Term IV.),	5
Horticulture,	51 **III.**	5							
Landscape Gardening,	50 **I.**	5							
Landscape Gardening,	51 **II.**	4	**II.**	Drawing 26,	3	Landscape Gardening 51,	4	Landscape Gardening 76,	4
Landscape Gardening,	52 **III.**	5		Mathematics 26,	2				
Landscape Gardening,	53 **IV.**	5		Entomology 26,	3				
Landscape Gardening,	75 **I.**	3	**III.**	Drawing 27,	3	Landscape Gardening 52,	5	Landscape Gardening 78 or 79,	3
Landscape Gardening,	76 **II.**	4		Mathematics 27,	3	Horticulture 51,	5	Landscape Gardening 77,	4
Landscape Gardening,	77 **III.**	4		Horticulture 27,	3	Landscape Gardening 78 or 79,	3	Floriculture 78,	3
Landscape Gardening, or	78 **III.**	3	**IV.**			Landscape Gardening 53,	5		
Landscape Gardening,	79 **III.**	3							
		49							

Sophomore Elective Prerequisites (Required). — Drawing 25, 26 and 27, Mathematics 26 and 27, Horticulture 27.

Additional Information. — Modifications may be permitted when they appear advisable.

Pomology. (Major.)

Professor Fred C. Sears, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	77 **II.**	5	**I.**			Pomology 50,	3	Pomology 75,	3
Agronomy,	75 **I.**	5				Agronomy 75,	5	Pomology 77,	5
Horticultural Manufactures,	75 **I.**	5						Pomology 80,	1
								Agronomy 75,	5
								Horticultural Manuf. 75,	5
Pomology,	50 **I.**	3	**II.**			Pomology 51,	3	Pomology 76,	3
Farm Management,	75 **II.**	3				Farm Management 75,	3	Pomology 81,	1
Horticultural Manufactures,	76 **II.**	3						Agronomy 77,	5
								Horticultural Manuf. 76,	3
Pomology,	51 **II.**	3	**III.**	Horticulture 27,	3	Pomology 52,	3	Pomology 78,	3
Pomology,	52 **III.**	3				Rural Engineering 78,	5	Pomology 82,	1
Pomology,	75 **I.**	3						Agricultural Economics 53,	5
Rural Engineering,	78 **III.**	5							
Agricultural Economics,	53 **III.**	5							
Pomology,	76 **II.**		**IV.**			Pomology 53,	5		
Pomology,	77 **I.**								
Pomology,	78 **III.**								
Pomology,	80 **I.**								
Pomology,	81 **II.**								
Pomology,	82 **III.**								
		43							

Sophomore Elective Prerequisites (Required). — Horticulture 27.

Advised. — Rural Engineering 26, Entomology 26 and 27.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose.

Vegetable Gardening. (Major.)

Associate Professor A. L. Dacy, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy,	75 **I.**	5	**I.**			Vegetable Gardening 51,	3	Vegetable Gardening 75,	5
Agronomy,	77 **II.**	5				Botany 50,	2	Agronomy 75,	5
Botany,	50 **I.**	2						Vegetable Gardening 78,	1
Botany,	51 **II.**	2							
Vegetable Gardening,	51 **I.**	3	**II.**	Botany 26,	3	Vegetable Gardening 52,	3	Vegetable Gardening 76,	5
Vegetable Gardening,	52 **II.**	3				Botany 51,	2	Vegetable Gardening 79,	1
Vegetable Gardening,	53 **III.**	3						Agronomy 77,	5
Vegetable Gardening,	54 **IV.**	5	**III.**	Horticulture 27,	3	Vegetable Gardening 53,	3	Vegetable Gardening 77,	5
Vegetable Gardening,	75 **I.**	5						Vegetable Gardening 80,	1
Vegetable Gardening,	76 **II.**	5	**IV.**			Vegetable Gardening 54,	5		
Vegetable Gardening,	77 **III.**	5							
Vegetable Gardening,	78	1							
Vegetable Gardening,	79	1							
Vegetable Gardening,	80	1							
		46							

Sophomore Elective Prerequisites (Required). — Botany 26, Horticulture 27.

Advised. — Rural Engineering 26, Entomology 26 and 27.

Additional Information. — The rest of the sophomore electives allowed are left to the student to choose.

Economic Botany. (Major.)

Professor A. Vincent Osmun, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	52 **I.**	3	**I.**	Chemistry 25,	3	Botany 52,	3	Botany 75,	5
Botany,	53 **II.**	3		German 25 or 28,	3	Botany 55,	3	Botany 78,	5
Botany,	54 **III.**	3				Chemistry 51,	8	Botany 86,	1
Botany,	55 **I.**	3							
Botany,	56 **II.**	3							
Botany,	75 **I.**	5	**II.**	Chemistry 26,	3	Botany 53,	3	Botany 76,	5
Botany,	76 **II.**	5		German 26 or 29,	3	Botany 56,	3	Botany 79,	5
Botany,	77 **III.**	5		Botany 26,	3			Botany 82,	3
Botany,	78 **I.**	5						Botany 87,	1
Botany,	79 **II.**	5							
Botany,	80 **III.**	5							
Botany,	82 **II.**	3	**III.**	German 27 or 30,	3	Botany 54,	3	Botany 77,	5
Botany,	83 **III.**	3						Botany 80,	5
Botany,	86 **I.**	1						Botany 83,	3
Botany,	87 **II.**	1						Botany 88,	1
Botany,	88 **III.**	1							
Chemistry,	51 **I.**	8							
		62	**IV.**						

Sophomore Elective Prerequisites (Required). — German 25 or 28, 26 or 29, 27 or 30, Botany 26.

Advised. — Chemistry 25 and 26.

Additional Information. — The balance of the sophomore electives allowed are left to the student to choose.

Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80).

Agricultural Chemistry. (Major.)

Professor Charles A. Peters, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 **I.**	8	**I.**	Chemistry 25,	3	Chemistry 51,	8	Chemistry 76,	5
Chemistry,	52 **II.**	8		German 25 or 28,	3	Chemistry 60,	3	Chemistry 80,	5
Chemistry,	62 **III.**	5							
Chemistry,	65 **III.**	5	**II.**	Chemistry 26,	3	Chemistry 52,	8	Chemistry 77,	3
Chemistry,	76 **I.**	5		German 26 or 29,	3	Chemistry 61,	3	Chemistry 90, 92, 94,	3
Chemistry,	77 **II.**	5							
Chemistry,	80 **I.**	5							
Chemistry,	87 **III.**	3							
Chemistry,	90 **II.**	3[1]							
Chemistry,	92 **II.**								
Chemistry,	94 **II.**								
Chemistry,	91 **III.**	5	**III.**	Chemistry 27,	5	Chemistry 62,	5	Chemistry 91, 93, 95,	5
Chemistry,	93 **II.**			German 27 or 30,	3	Chemistry 65,	5	Chemistry 87,	3
Chemistry,	95 **III.**								
		50[2]	**IV.**						

Sophomore Elective Prerequisites (Required). — Chemistry 25, 26 and 27.

Advised. — German 25 or 28, 26 or 29, 27 or 30, Entomology 26 and 27.

Additional Information. — The balance of the sophomore electives allowed are left for the student to choose.

[1] Courses 90, 92, 94 may be changed from 3 credits to an option of 3 or 5 credits. Students will select one course from groups 90, 92, 94, and 91, 93, 95 respectively.

[2] Only 45 credits required.

Economic Entomology. (Major.)

Professor Henry T. Fernald, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany,	50 **I.**	3	**I.**	French 25 or 28, or German 25 or 28,	3	Entomology 50,	3	Entomology 76,	5
or						Entomology 53,	5	Vegetable gardening 50,	3
Botany,	52 **I.**	3				Botany 50 or 52,	3	Plant materials 50,	5
Entomology,	50 **I.**	3		Chemistry 25,	3	Zoölogy 50 or 53,	3		
Entomology,	51 **II.**	3				or			
						Chemistry 51,	8		
Entomology,	53 **I.**	5	**II.**	French 26 or 29, or German 26 or 29,	3	Entomology 51,	3	Entomology 77,	3
Entomology,	54 **II.**	3				Entomology 54,	3	Entomology 90,	3
Entomology,	55 **III.**	3				Microbiology 50,	5		
Entomology,	75 **III.**	4		Entomology 26,	3				
Entomology,	76 **I.**	5		Botany 26,	3				
Entomology,	77 **II.**	3	**III.**	French 27 or 30, or German 27 or 30,	3	Entomology 55,	3	Entomology 78,	4
Entomology,	78 **III.**	4				Entomology 75,	4	Plant materials 51,	5
Entomology,	90 **II.**	3				Horticulture 27,	3	Pomology 78,	3
				Entomology 27,	2	Pomology 79,	3		
Zoölogy,	50 **I.**	3	**IV.**						
or									
Zoölogy,	53 **I.**	3							
or									
Chemistry,	51 **I.**	8							
		42 or 47							

Sophomore Elective Prerequisites (Required). — Entomology 26 and 27, Botany 26.

Advised. — French or German 25 to 27 or 28 to 30, Chemistry 25; the other subjects (except Entomology) in the last three columns above are merely suggested as desirable to choose from.

Microbiology. (Major.)

Professor Charles E. Marshall, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry,	51 I.	8	I.	Chemistry 25,	3	Microbiology 50,	5	Microbiology 81,	5
Chemistry,	52 II.	8		German or French 25 or 28,	3	Chemistry 51,	8	Microbiology 82,	5
Microbiology,	50 I.							Microbiology 83,	5
or		5							
Microbiology,	50 II.		II.	German or French 26 or 29,	3	Microbiology 51,	5	Microbiology 75,	5
or						Chemistry 52,	8	Microbiology 80,	5
Microbiology,	50 III.					Microbiology 50,	5	Dairying 75,	5
Microbiology,	51 II.	5							
or									
Microbiology,	51 III.		III.	Chemistry 27,	5	Microbiology 50,	5	Microbiology 76,	5
Microbiology,	52 III.	5		German or French 27 or 30,	3	Microbiology 51,	5		
				Physics 27,	5	Microbiology 52,	5		
Microbiology,	81 I.								
or									
Microbiology,	82 I.	5	IV.						
or									
Microbiology,	83 I.								
Microbiology,	80 II.								
or									
Microbiology,	75 II.	5							
or									
Dairying,	75 I.								
		41							

Sophomore Elective (Recommendations). — German or French 25 or 28, 26 or 29, 27 or 30, Chemistry 25 and 27, and Physics 27.

Additional Information. — The rest of the sophomore electives allowed are left for the student to choose. Microbiology 51, fall term, will be taken by students who have had Microbiology 50 the preceding spring, and by those who are permitted to omit Microbiology 50.

Rural Journalism. (Major.)

Associate Professor Robert W. Neal, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Rural Journalism,	**50 I.**	3	**I.**			Journalism 50,	3	Journalism 77,	3
Rural Journalism,	**51 II.**	3				[Journalism 53,	3]	Journalism 80,	4 (5)
						Agricultural Economics 51,	5		
Two out of three: —									
[Rural Journalism,	**53 I.**	3]	**II.**	Economics and Sociology 26,	5	Journalism 51,	3	Journalism 78,	3
Rural Journalism,	**54 II.**	3				Journalism 54,	3	Journalism 81,	4 (5)
Rural Journalism,	**55 III.**	3				Economics and Sociology 51,	5		
Two out of three: —									
Rural Journalism,	**77 I.**	3	**III.**			Journalism 55,	3	[Journalism 79,	3]
Rural Journalism,	**78 II.**	3						Journalism 82,	4 (5)
Rural Journalism,	**79 III.**	3							
All: —									
Rural Journalism,	**80 I.**	4 (5)							
Rural Journalism,	**81 II.**	4 (5)							
Rural Journalism,	**82 III.**	4 (5)							
Agricultural Economics,	**51 III.**	5	**IV.**	The major outline will be restated for 1919–20.					
Economics and Sociology,	**51 I.**	5							
Courses to be individually prescribed for remainder of 45 hours.		5							
		45							

Sophomore Prerequisites. — All sophomore English.

Sophomore Recommendations. — French or German; Drawing 25. *For agricultural journalism especially:* Animal Husbandry 25, 26, Chemistry 30, Entomology 26, 27.

Agricultural Economics. (Major.)

Professor Alexander E. Cance, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics, . . .	50 **I.**	5	**I.**			Agricultural Economics 50,	5	Agricultural Economics 77,	5
Agricultural Economics, . . .	52 **II.**	5				Economic Sociology 51, .	5		
Agricultural Economics, . . .	53 **III.**	5							
Agricultural Economics, . . .	78 **III.**	3							
Agricultural Economics, . . .	76 **II.**		**II.**			Agricultural Economics 52,	5	Agricultural Economics 76,	5
or		5				Rural Sociology 51, . .	3	Rural Sociology 78, . .	5
Agricultural Economics, . . .	77 **I.**					Economic Sociology 50, .	5		
Economic Sociology, ...	51 **I.**	5							
Economic Sociology, ...	50 **II.**	5	**III.**			Rural Sociology 52, . .	3	Farm Management 76, .	5
Farm Management, ...	76 **III.**	5				Agricultural Economics 53,	5	Agricultural Economics 78,	3
Rural Sociology, ...	51 **II.**								
or		3							
Rural Sociology, ...	52 **III.**		**IV.**						
Rural Sociology, ...	78 **II.**	5							
		46							

Additional Information. — The sophomore electives are left to the student to choose. Animal husbandry is suggested for terms I. and II., and Economic Sociology for term III.

Agricultural Education. (Major.)

Professor William R. Hart, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Education,	50 **I.**	5	**I.**	Animal Husbandry 25,		Botany 50,	2	Agronomy 75,	5
Agricultural Education,	51 **II.**	5		Rural Engineering 25,		Agricultural Education 50,	5	Poultry 50,	3
Agricultural Education,	52 **I.**					Agronomy 50,	5	Dairying 77,	5
Agricultural Education,	52 **II.**					Pomology 50,	3	Agricultural Education 52,	5
Agricultural Education,	52 **III.**							Farm Management 75,	3
Agricultural Education,	52 **IV.**	5							
Agricultural Education,	53 **III.**	5	**II.**	Entomology 26,		Botany 51,	2	**Agricultural Education, 51,**	**5**
Agronomy,	50 **I.**	5		Rural Engineering 26,				**Agricultural Education, 52,**	**5**
Agronomy,	75 **I.**	5		Animal Husbandry 26,					
Botany,	50 **I.**	2	**III.**	Entomology 27,		Market Gardening 50,	3	**Agricultural Education, 52,**	**5**
Botany,	51 **II.**	2		Horticulture 27		Agricultural Education 53,	5		
Dairying,	77 **I.**	5							
Farm Management,	75 **II.**	3	**IV.**					Agricultural Education 52,	5
Market Gardening,	50 **III.**	3							
Pomology,	50 **I.**	3							
Poultry Husbandry,	50 **I.**	3							
		51							

Additional Information. — The sophomore electives allowed are left to the student to choose.

Substitutions of other technical courses for some of those above mentioned may be made to meet the needs of individual students.

A selection is allowed of Poultry Husbandry 50 and Market Gardening 50, making 6 credits, or Agronomy 75, 5 credits, making the total credits 45 or 46.

Rural Sociology. (Major.)

Professor John Phelan, *Adviser*.

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agricultural Economics,	50 **I.**	5	**I.**			Agricultural Economics 50,	5	Rural Sociology 75,	3
Agricultural Economics,	52 **II.**	5				Rural Sociology 50,	3	Economics and Sociology 75,	5
Economics and Sociology,	51 **II.**	5							
Economics and Sociology,	75 **I.**	5							
Economic Sociology,	76 **III.**	5	**II.**			Rural Sociology 51,	3	Rural Sociology 77,	3
Rural Journalism,	55 **III.**	3				Agricultural Economics 52,	5	Rural Sociology 78,	5
						Agricultural Education 52,	5		
						Economic Sociology 51,	5		
Rural Sociology,	50 **I.**	3	**III.**			Rural Journalism 55,	3	Economic Sociology 76,	5
Rural Sociology,	52 **III.**	3				Rural Sociology 52,	3		
Rural Sociology,	51 **II.**	3							
Rural Sociology,	77 **II.**	3	**IV.**						
Rural Sociology,	75 **I.**	3							
Agricultural Education, or Rural Sociology,	52 **II.** 78 **II.**	5							
		48							

Additional Information. — The sophomore electives allowed are left to the student to choose.

Description of Courses.

Description of Courses.

DIVISION OF AGRICULTURE.

Professor Foord.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agriculture and Horticulture. Freshmen. This course continuing through the year constitutes the required elementary work dealing with the foundations of the subjects of live stock and the crops of the field, orchard and the garden. Several departments collaborate in giving the work; three credits each term are assigned to this course. For a description of the work, and for information as to distribution of credits, see the following: —

Agronomy 1, I., II., III.
Animal Husbandry 1, I.
Poultry Husbandry 1, II.
Horticulture 1, I., II., III.

Agronomy.

Associate Professor Beaumont, Assistant Professor Cooper, Mr. Merkle, Mr. Gordon Mr. Mallorey.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Agronomy. — Freshmen. Given as part of the freshman agriculture and horticulture. This course aims, by actual contact with the plants and the plant products, to make the students familiar with the common field, garden and orchard crops of Massachusetts.

1. 2 2-hour laboratory periods. Credit, 2.
2. 1 2-hour laboratory period. Credit, 1.
3. 2 2-hour laboratory periods. Credit, 2.

Assistant Professor Cooper and Mr. Merkle.

27. **III.** Soils and Fertilizers. — Sophomores. A study of soils and their properties, soil management, methods of soil improvement and maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments.

4 class hours. 1 2-hour laboratory period, credit, 5.

Associate Professor Beaumont and the Department.

Prerequisites, Freshman-required Chemistry.

Elective Courses.

50. **I.** Field and Forage Crops. — For juniors; seniors may elect. History, classification and production of corn and of those grasses, legumes, root and tuber crops suited to New England conditions. Crops of less im-

portance in New England are briefly considered. The work includes lecture, laboratory and field study.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Assistant Professor COOPER and the DEPARTMENT.

Prerequisites, Agronomy 27, Botany 3.

51. **III.** ADVANCED FIELD CROPS. — For juniors; seniors may elect. Study of the cereals and other field crops not taken up or only briefly considered in Course 50. General problems of crop production are also considered, and the work is not entirely confined to New England conditions. The laboratory work includes a study of the cereals, the quality of seeds, grains and crop products, crop problems and field work with such crops as are available.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Assistant Professor COOPER and the DEPARTMENT.

Prerequisite, Agronomy 50.

75. **I.** ADVANCED SOILS. — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous vegetation and other factors which indicate the fertility and adaptation of the soil; accompanied by a laboratory study of the physical properties of the soils sampled.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Associate Professor BEAUMONT and Mr. MERKLE.

Prerequisite, Agronomy 27.

76. **III.** DRAINAGE AND IRRIGATION. — For seniors; juniors may elect. A field and lecture course on soil improvement by drainage and irrigation, with special reference to problems of this nature as faced by Massachusetts farmers. To accompany Rural Engineering 79, **III.**

1 class hour. 1 2-hour laboratory period, credit, 2.

Mr. MERKLE.

Prerequisites, Mathematics 26 and 27, Agronomy 27.

77. **II.** MANURES AND FERTILIZERS. — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and culture work.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Associate Professor BEAUMONT and Mr. MERKLE.

Prerequisite, Agronomy 27.

78. **II.** BREEDING OF FIELD CROPS. — Seniors. This course deals with the improvement, by selection and breeding, of the crops studied in Courses 50 and 51.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor COOPER.

Prerequisite, Agronomy 51.

Animal Husbandry.

Professor McNutt, Associate Professor Pontius.

Required Course.

1. **II.** Animal Husbandry. — Freshmen. Given as part of the freshman agriculture and horticulture. This course acquaints the student with the foundations of the live-stock industry. In the lectures the types and market classes of farm animals, and their uses, are considered; in the laboratory period elementary judging practice familiarizes the student with animals of the various types.

1 class hour. 1 2-hour laboratory period, credit, 2.
Professor McNutt.

Elective Courses.

25. **I.** Breeds and Types of Live Stock. — Sophomores. A course covering the origin, history, development and characteristics of the different breeds of horses, cattle, sheep and swine. Textbook, Plumb's "Breeds and Types of Farm Animals."

2 lectures. 1 2-hour laboratory period, credit, 3.
Associate Professor Pontius.

26. **II.** Breeds and Types of Live Stock. — Sophomores. Continuation of Course 25.

2 lectures. 1 2-hour laboratory period, credit, 3.
Associate Professor Pontius.

Prerequisite, Animal Husbandry 25.

50. **II.** Live-Stock Management. — For juniors; seniors may elect. The work of this course consists of laboratory work by the individual students in the handling of live stock; with horses, such work as halter breaking, harnessing, casting and fitting for show will be done; similarly, the practical handling of cattle, sheep and swine will be fully treated. Special study is given to halter making, splicing, hitches, knots and all rope work.

1 lecture. 2 2-hour laboratory periods, credit, 3.
Professor McNutt.

Prerequisites, Animal Husbandry 25 and 26.

51. **III.** Principles of Breeding. — For juniors; seniors may elect. This course is designed to familiarize the student with the problems that are involved in animal improvement; to acquaint him with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. "Genetics," by Herbert E. Walter. Supplementary reading.

3 class hours. Credit, 3.
Associate Professor Pontius.

Prerequisite, Zoölogy 25.

52. **III.** Advanced Stock Judging. — For juniors; seniors may elect. This course is designed to equip animal husbandry students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits will be made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.
Professor McNutt.

Prerequisite, Animal Husbandry 50.

75. **I.** Feeding and Management. — For seniors; juniors may elect. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."

3 class hours. Credit, 3.
Associate Professor Pontius.

Prerequisite, Chemistry 30 or 51.

76. **II.** Feeding and Management. — For seniors; juniors may elect. A study of the feeding, care and management of dairy cattle from birth to maturity, with especial attention to economic production. Textbook, Henry's "Feeds and Feeding."

3 class hours. Credit, 3.
Associate Professor Pontius.

Prerequisite, Chemistry 30 or 51.

77. **III.** Feeding and Management. — For seniors; juniors may elect. A continuation of Courses 75 and 76, dealing in a similar manner with horses, sheep, beef cattle and swine.

3 class hours. Credit, 3.
Associate Professor Pontius.

Prerequisite, Animal Husbandry 75.

78. **II.** Herd and Stud-book Study. — For seniors; juniors may elect. An advanced course in the study of the breeds of live stock, familiarizing the student with the detailed history of the breed, the most productive sires and dams of the various breeds, and the successful lines and methods of breeding.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor McNutt.

Prerequisite, Animal Husbandry 75.

80. **III.** Seminar. — For seniors majoring in animal husbandry only. Advanced study upon questions pertaining to live stock and live-stock production. Each student electing this work will choose some particular line of work in which he is specially interested, and will pursue study in this subject by reading, compilation and research. There will be no regular lecture period, but seminars will be held. A satisfactory report of the results must be presented in a thesis.

1 2-hour laboratory period, credit, 1.
Professor McNutt.

Dairying.

Professor Lockwood,[1] Associate Professor Jamison, Mr. Van Horn, Mr. Drain.

Elective Courses.

50. **I.** Milk and Milk Composition. — For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Associate Professor Jamison and the Department.

51. **III.** Butter Making. — For juniors; seniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy machinery and care thereof.

2 class hours. 2 3-hour laboratory periods, credit, 5.

Associate Professor Jamison and Mr. Van Horn.

Prerequisite, Dairying 50.

75. **II.** Market Milk. — For seniors; juniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing; sterilizing; standardizing and modifying; milk laws and inspection.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Lockwood and the Department.

Prerequisite, Dairying 50.

76. **III.** Milk Products. — For seniors; juniors may elect. The manufacture of milk products other than butter, including cheddar cheese, soft and fancy cheese, ice cream, condensed milk, casein, milk powder, etc. Laboratories, largely the making of soft and fancy cheese and ice cream.

2 class hours. 2 3-hour laboratory periods, credit, 5.

Mr. Drain.

Prerequisite, Dairying 75.

77. **I.** Dairying. — For seniors; juniors may elect. A general course designed primarily for students who wish to take only one course in dairying. The work given will cover briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.

3 lecture hours. 2 2-hour laboratory periods, credit, 5.

Mr. Drain and the Department.

---

[1] On leave of absence, 1918–19.

Farm Management.

Professor Foord, Mr. Peacock.

Elective Courses.

75. **I.** Farm Cost Accounting. — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts, and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Mr. Peacock.

76. **III.** Farm Management. — For seniors; juniors may elect. The student should have had considerable farm experience before taking this course. Discussion and study of farming as a business; size, diversity and production and their influence on the farmer's labor income; relation of live stock to profits; regions and types of farming; cropping systems; arrangement of fields and buildings; use of labor, horses and machinery; marketing; methods of renting land; proper division of capital; choosing and buying a farm.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Foord and Mr. Peacock.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26.

Poultry Husbandry.

Professor Graham, Dr. Goodale, Associate Professor Payne, Mr. Banta.

Required Course.

1. **I.** Poultry Husbandry. — Freshmen. Given as part of the freshman agriculture and horticulture. The object of this course is to familiarize the student in a general way with the fundamental principles of poultry husbandry, — types of poultry houses, appliances, feeds and market products.

1 2-hour laboratory period, credit, 1.

Mr. Banta.

Elective Courses.

50. **I.** Elements of Poultry Culture. — For juniors; seniors may elect. This course consists of a comprehensive study of opportunities in poultry culture, poultry-house construction, poultry-house equipment, feeds and feeding, winter-egg production, types and breeds of poultry.

3 class hours. Credit, 3.

Professor Graham, Associate Professor Payne and Mr. Banta.

51. **I.** Poultry Practice Work. — For juniors; seniors may elect. This is a practical laboratory course providing a study of external parasites, insecticides, poultry carpentry, caponizing, killing and picking; dressing and packing poultry.

2 2-hour laboratory periods, credit, 2.

Associate Professor Payne.

Prerequisite, must be accompanied by Poultry 50.

52. **II.** Elements of Poultry Culture. — For juniors; seniors may elect. This course treats the subjects of incubation, brooding, care of growing stock, breeding for egg-production and diseases of poultry.
3 class hours. Credit, 3.
Associate Professor Payne and Mr. Banta.

Prerequisite, Poultry 50.

53. **III.** Incubation and Brooding. — For juniors; seniors may elect. In this course students are required to set up and operate incubators and brooders, make a systematic study of the development of the chick in the egg and the care of sitting hens. Laboratory time by arrangement.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Associate Professor Payne.

Prerequisite, Poultry 52.

54. **III.** Pen Management. — For juniors; seniors may elect. This is a practical laboratory course. Students are required to care for a pen of fowls, keeping accurate records of eggs produced, food consumed, weather conditions, health of fowls and profit and loss.
1 2-hour laboratory period, credit, 1.
Mr. Banta.

Prerequisite, Poultry 50.

55. **I., II. and III.** Investigational Work. — Seniors. This course is designed especially for students who are planning to do experiment station work. Students will be assigned specific problems to work out experimentally, or they may be required to assist in carrying on such work.
1 to 5 2-hour laboratory periods, credits, 1 to 5.
Dr. Goodale.

75. **II.** Poultry Management. — Seniors. A detailed study of large poultry farms and their equipment, such as bone cutters, feed cutters, cramming machines, etc.; the laying out and planning of poultry buildings of all kinds; mating of fowls. Attention to poultry diseases and investigation work carried on by experiment station is prominent. A few good poultry plants will be visited by the class for practical demonstrations.
5 class hours. Credit, 5.
Professor Graham.

Prerequisites, Poultry 53, 54, 76 and 77.

76. **I.** Advanced Poultry Judging. — Seniors. This course includes a study of the origin and history of breeds and varieties, poultry organizations and poultry shows. The laboratory work covers score card and comparative judging of exhibition and utility poultry; conditioning show birds, and applying the latest methods of selecting high and low producing hens. A few of the best Connecticut Valley poultry shows will be visited by the class. The American Standard of Perfection will be used as a text.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Mr. Banta.

Prerequisite, Poultry 53.

77. **I.** Market Poultry and Poultry Products. — Seniors. This course includes the study of market classifications of poultry, eggs and feathers, the requirements of different markets, methods of marketing, advantages and disadvantages of cold storage of poultry and eggs. Students will be required to fatten several lots of chickens by different methods and rations. Accurate data must be kept showing the gain in weight and quality, also the cost of feed, labor, etc., and the profit and loss. Preserving eggs, judging and scoring of market poultry, both alive and dressed, and market eggs will be an important feature of this course.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Associate Professor Payne.

Prerequisites, Poultry 50, 51 and 52.

Rural Engineering.

Professor Gunness.

Elective Courses.

25. **I.** and **III.** Carpentry. — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction.

2 2-hour laboratory periods, credit, 2.
Rural Engineering Department.

26. **II.** and **III.** Repair of Farm Equipment. — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering, babbitting and fitting bearings, lining up shafting, lacing belts and splicing rope. Practice in the use of machinist's tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.
The Department.

75. **I.** Farm Structures. — For seniors; juniors may elect. Study of the strength, durability and cost of building materials; water supply; lighting and heating systems for the farm; drawing plans, writing specifications and estimating the cost of buildings; concrete construction as applied to foundations, silos, tanks, posts, floors and walks.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gunness.

76. **I.** Farm Mechanics. — For seniors; juniors may elect. A general study of the farm equipment; farm buildings, their location, plan and arrangement; water supply; sewage disposal; lighting and heating systems; farm power and farm machinery. Course 76 has been planned for the benefit of those students who want a general course in farm mechanics but cannot spend the time to take the two courses 75 and 78.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Gunness.

77. **II.** Power Machinery. — For seniors; juniors may elect. Steam and gasoline engines, refrigerating machinery, electric motors and dynamos. Practice in pipe fitting, soldering, babbitting and fitting bearings, lacing belts

and packing valves. Course 77 is intended primarily for dairy students, but would be valuable to any man who would expect to use engines, pumps or electrical machinery.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Gunness.

78. **III.** Farm Machinery. — For seniors; juniors may elect. Study of the care and operation of tillage, seeding, harvesting, pumping and spraying machinery; steam and gas engines and gas tractors. Special attention will be given to the use of power on the small farm.

2 class hours. 3 2-hour laboratory periods, credit, 5.
Professor Gunness.

79. **III.** Drainage and Irrigation Engineering. — For seniors; juniors may elect. This course covers the engineering phase of drainage and irrigation. The various systems are studied, and practice is given in the design of drainage and irrigation systems. Field work gives practice in surveying for drains, platting, locating drains, erecting batterboards and laying tile. Practice is given in assembling equipment for spray irrigation, and the flow of water through nozzles is studied by means of laboratory tests.

1 class hour. 1 4-hour laboratory period, credit, 3.
Professor Gunness and Mr. Merkle.

Prerequisite, must be taken with Agronomy 76.

DIVISION OF HORTICULTURE.

Professor Waugh,[1] Assistant Professor Thompson, Assistant Professor ——.

[The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.]

Required Course.

1. **I.** 2. **II.** 3. **III.** Horticulture. — Freshmen. Given as part of the freshman agriculture and horticulture.

Elective Courses (General).

27. **III.** Nursery Practice. — For sophomores; juniors and seniors may elect. This course treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Thompson.

50. **I.** Plant Materials. — For juniors; seniors may elect. This course aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thompson.

Prerequisite, Horticulture 27.

51. **III.** Plant Materials. — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor Thompson.

Prerequisite, Horticulture 50.

75. **I.** Plant Breeding. — For seniors and graduate students. [Not given in 1917–18.] This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops.
3 class hours. 2 2-hour laboratory periods, credit, 5.

Prerequisite, open only to students well prepared in agricultural or horticultural subjects.

[1] On leave of absence, 1918–19.

Floriculture.

Assistant Professor Hecht,[1] Mr. Wildon.

Elective Courses.

50. **I.** Greenhouse Management. — For juniors; seniors may elect. This course is designed to familiarize students with the methods followed in the management of greenhouse crops. The students are instructed in the practical operations of watering, potting, fumigating, ventilating and in the methods of propagation of plants by seed and cuttings. They will also be expected to arrange their hours according to the needs of the work.
2 class hours. 1 4-hour laboratory period, credit, 4.
Assistant Professor Hecht and Mr. Wildon.
Prerequisite, Horticulture 27.

51. **II.** Greenhouse Management. — For juniors; seniors may elect. Continuation of Course 50.
2 class hours. 1 4-hour laboratory period, credit, 4.
Assistant Professor Hecht and Mr. Wildon.
Prerequisite, Floriculture 50.

52. **III.** Greenhouse Management. — For juniors; seniors may elect. A continuation of Courses 50 and 51.
2 class hours. 1 4-hour laboratory period, credit, 4.
Assistant Professor Hecht and Mr. Wildon.
Prerequisite, Floriculture 51.

53. **I.** Greenhouse Construction. — For juniors; seniors may elect. The location, arrangement, construction, cost, heating and ventilating of greenhouse structures; also the drawing of plans and drafting of specifications for commercial houses and private ranges. Such practical work as glazing, the construction of concrete benches and cold frames will be included in this course.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht and Mr. Wildon.
Prerequisite, should be taken with Floriculture 50.

54. **II.** Greenhouse Construction. — For juniors; seniors may elect. A continuation of Course 53.
2 class hours. 1 2-hour laboratory period.
Assistant Professor Hecht.
Prerequisite, Floriculture 53.

75. **I.** Commercial Floriculture. — Seniors. A detailed study will be made of the methods of culture for greenhouse plants and cut flowers for wholesale and retail markets. The care and marketing of all florists' crops will also be considered. Assigned readings on these topics.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht.
Prerequisite, Floriculture 52.

[1] On leave of absence, 1918–19.

76. **III.** Commercial Floriculture. — Seniors. As stated under Course 75.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht.

Prerequisites, Floriculture 75 and 80.

77. **II.** Conservatory Work and Decorative Plants. — Seniors. A study of the tropical and subtropical foliage and flowering plants used in conservatory work. Their arrangement and care will also be considered. Assigned readings.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht.

Prerequisite, Floriculture 75.

78. **III.** Garden Flowers and Bedding Plants. — Juniors and seniors. This course aims to make the student familiar with those annuals, herbaceous perennials, bulbs and bedding plants used in landscape work. Their propagation, culture and uses will be considered. Assigned readings and field trips.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht and Mr. Wildon.

79. **III.** Seminar. — For seniors majoring in floriculture only. Advanced study of subjects pertaining to commercial floriculture or private garden work. All students electing this work will be assigned a specific problem, and will pursue study in these problems by reading and research. No regular lectures will be given, but seminars will be conducted each week. A satisfactory report of the results must be presented.
2 to 6 laboratory hours. Not to exceed 3 credits.
Assistant Professor Hecht.

80. **II.** Commercial Floriculture. — Seniors. As stated under Course 75.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor Hecht and Mr. Wildon.

Prerequisite, Floriculture 75.

Forestry.

Professor Clark.

Elective Courses.

50. **I.** Dendrology. — For juniors; seniors may elect. During the first part of the term frequent field trips will be made to identify and study the habits of our native forest trees. Later, the classification, range, distribution, forest habits, quality, uses and identification of wood of the commercial timber trees of the United States will be studied. Lectures, recitations, laboratories or field work at option of instructor.
3 2-hour laboratory periods, credit, 3.
Professor Clark.

51. **II.** Wood Technology. — For juniors; seniors may elect. A study of the commercial woods found in the lumber markets, methods of identification, uses, strength values, technical qualities, decay and methods of preservation.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Clark.

52. **III.** Principles of Forestry. — For juniors; seniors may elect. A lecture course for the purpose of giving the students a general view of the whole field of forestry and what forestry attempts to accomplish and has accomplished. Not required of students who propose to major in forestry.

2 class hours. Credit, 2.

Professor Clark.

53. **III.** Silviculture. — For juniors; seniors may elect. Factors influencing forest growth; forest types; silvicultural systems; care and protection of forests; forest description; forest nursery practice and forest planting.

1 class hour. 1 4-hour laboratory period, credit, 3.

Professor Clark.

Prerequisite, Forestry 50.

54. **IV.** Arboriculture. — For juniors; seniors may elect. A course dealing with problems of shade tree propagation, protection and repair; the choice and grouping of species; shade tree laws. Assigned readings.

120 hours' field work, credit, 5.

Professor Clark.

75. **I.** Forest Mensuration. — For seniors; juniors may elect. Methods of determining the volume of trees, logs and entire forests. Methods of computing volume tables, tree and forest growth and yield tables. Timber estimating.

3 class hours. 72 hours' field work, credit, 5.

Professor Clark.

78. **III.** Seminar — Report. — Seniors. This may involve research, laboratory or field work in the investigation of some subject, together with a review of the literature relating to it and an original written report evidencing the results. Subject to be chosen in conference with Professor Clark.

6 laboratory hours, credit, 3.

Professor Clark.

Horticultural Manufactures.

Professor Chenoweth.

Elective Courses.

75. **I.** Horticultural Manufactures. — For seniors and graduate students. A practical course in food preservation dealing primarily with fruits and vegetables. The canning of fruits and vegetables as practiced in the home and in commercial canneries; evaporation of fruits and vegetables, the various types of equipment and methods of preparation of products. The manufacture of (*a*) fruit products, such as butters, jams, jellies, fruit

juices, marmalades, preserves, vinegars, pastes, etc.; (*b*) vegetable products, as pickles, piccalilli, sauerkraut, soups, etc. Particular attention will be given to study and use of all types of equipment suitable for use in the home or small factory, together with methods for testing a large variety of manufactured products. During this term the emphasis will be on canning, drying and study of equipment.

2 class hours. 3 2-hour laboratory periods per week, credit, 5.
Professor CHENOWETH.

76. **II.** HORTICULTURAL MANUFACTURES. — For seniors and graduate students. A continuation of Course 75. The emphasis in this course is placed on the manufacturing and testing of fruit and vegetable products.

1 class hour. 2 laboratory periods per week, credit, 3.
Professor CHENOWETH.

Prerequisite, Horticultural Manufactures 75.

Landscape Gardening.

Professor WAUGH,[1] Assistant Professor HARRISON.

Elective Courses.

50. **I.** ELEMENTS OF LANDSCAPE GARDENING. — Juniors. Reconnoissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Assistant Professor HARRISON.

Prerequisites, Mathematics 26 and 27, Drawing 25, 26 and 27, Horticulture 27.

51. **II.** ELEMENTS OF LANDSCAPE GARDENING. — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 50.

52. **III.** GENERAL DESIGN. — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems. Must be followed by Course 53.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Assistant Professor HARRISON.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

53. **IV.** (Summer.) GENERAL DESIGN. — Juniors. As stated under Course 52. [Will be given in the summer term when that is established; meantime, will be given in term **I**, senior year.]

120 laboratory hours, credit, 5.
Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 52.

[1] On leave of absence, 1918–19.

75.[1] **I.** Theory of Landscape Art. — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.
3 class hours. Credit, 3.
Professor Waugh.

76.[2] **II.** Civic Art. — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.
3 3-hour laboratory periods, credit, 4.
Professor Waugh.
Prerequisite, Landscape Gardening 53.

77.[2] **III.** Civic Art. — Seniors. As stated under Course 76.
3 3-hour laboratory periods, credit, 4.
Professor Waugh.
Prerequisite, Landscape Gardening 76.

78. **III.** Architecture. — Alternating with Course 79; given in 1918–19. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing.
3 class hours. Credit, 3.
Assistant Professor Harrison.

79. **III.** Construction and Maintenance. — Alternating with Course 78; given in 1919–20. Juniors and seniors. Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.
3 class hours. Credit, 3.
Assistant Professor Harrison.

Vegetable Gardening.

Professor Tompson, Associate Professor Dacy.

Elective Courses.

50. **I.** General Vegetable Gardening. — Juniors; seniors may elect. A general course for students not specializing in vegetable gardening. Designed to teach the fundamentals of vegetable gardening. Soils, fertilizers, garden crops, general methods of management. [Offered for first time in 1919–20.]
2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Dacy.

51. **I.** Practical Vegetable Gardening. — Juniors; seniors may elect. A study of the principles of vegetable gardening. Deals with such

[1] Not given in 1918–19.
[2] Given by Assistant Professor Harrison in 1918–19.

questions as the selection of a location; soils, manures and fertilizers, green manure and cover crops; seeds and seeding; the construction and management of hotbeds and cold frames; garden planning, planting, tillage, irrigation; control of insects and diseases; harvesting, marketing and storing. Includes a detailed study of the cultural requirements of the common vegetable crops, and the principles of rotation and double cropping. Text and reference books. Laboratory and field exercises.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Dacy.

Prerequisite, Horticulture 27.

52. **II.** Practical Vegetable Gardening. — Juniors; seniors may elect. As stated under Course 51.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Dacy.

Prerequisite, Vegetable Gardening 51.

53. **III.** Practical Vegetable Gardening. — Juniors; seniors may elect. As stated under Course 51.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Dacy.

Prerequisite, Vegetable Gardening 52.

54. **IV.** Vegetable Gardening Practice. — Field work in summer term after junior year. The work of this course will be under the direct supervision of an instructor, and will give the student an unusual opportunity to learn, at first hand, the methods and problems of commercial vegetable growing. Most of the work will be in the field devoted to seed planting, cultural practices, harvesting and preparing for market. Required of those majoring in vegetable gardening.

120 laboratory hours, credit, 5.

Prerequisite, Vegetable Gardening 53.

75. **I.** Systematic Vegetable Gardening. — Seniors. This course will include the systematic study of varieties, types and strains of the leading vegetable crops; the establishing of types, determination of quality of varieties; seed growing, variety improvement, rogueing, seed harvesting, curing and storing.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Associate Professor Dacy.

Prerequisite, Vegetable Gardening 54.

76. **II.** Greenhouse Construction and Vegetable Forcing. — Seniors. A study of types, materials, construction, location, arrangement, capacity and cost of greenhouses for growing vegetables. A brief consideration of the heating plant, — the type, installation, piping and management; also the study of greenhouse vegetable crops and their production as practiced by commercial growers.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Associate Professor Dacy.

Prerequisite, Vegetable Gardening 75.

77. **III.** Commercial Vegetable Growing. — Seniors. A consideration of vegetable growing as a business. A study of this specialized type of farming, including places where developed, types, extent, economic importance, capitalization, equipment and other fundamental problems of commercial vegetable gardening. Students will assist in the planning and operation of a typical market-gardening area. Visits will be made to market-gardening and truck-gardening farms.

3 class hours. 2 2-hour laboratory periods, credit, 5.
Associate Professor Dacy.

Prerequisite, Vegetable Gardening 76.

78. **I.** Seminar. — For seniors majoring in vegetable gardening. Each student will be assigned problems relating to the business of vegetable gardening. Reports on the work on these problems will be made each week to the seminar, and the results presented as a thesis.

Credit, 1.
Professor Tompson and Associate Professor Dacy.

79. **II.** Seminar. — For seniors majoring in vegetable gardening. A continuation of Course 78. One seminar meeting each week.

Credit, 1.
Professor Tompson and Associate Professor Dacy.

80. **III.** Seminar. — For seniors majoring in vegetable gardening. A continuation of Course 79. One seminar meeting each week.

Credit, 1.
Professor Tompson and Associate Professor Dacy.

Pomology.

Professor Sears, Assistant Professor Drain.

Elective Courses.

50. **I.** Practical Pomology. — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Horticulture 27.

51. **II.** Practical Pomology. — For juniors; seniors may elect. As stated under Course 50.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Pomology 50.

52. **III.** Practical Pomology. — For juniors; seniors may elect. As stated under Course 50.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor Sears.

Prerequisite, Pomology 51.

53. **IV.** (Summer.) Small Fruits. — For juniors; seniors may elect. The growing, harvesting, marketing and storing of small fruits, including currants, gooseberries and grapes, together with thinning, spraying, picking and marketing of tree fruits at the college orchards and in private commercial orchards.

120 laboratory hours, credit, 5.
The Department.

75. **I.** Systematic Pomology. — Seniors. A study of the varieties of the different fruits and of nomenclature, with critical descriptions; special reference being given to relationships and classification. Lectures, laboratory and field exercises.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Assistant Professor Drain.

Prerequisite, Pomology 52.

76. **II.** Systematic Pomology. — Seniors. As stated under Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Assistant Professor Drain.

Prerequisite, Pomology 75.

77. **I.** Commercial Pomology. — Seniors only, majoring in pomology. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Assistant Professor Drain.

Prerequisite, Pomology 52.

78. **III.** Spraying. — Seniors. A study of (*a*) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (*b*) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (*c*) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Sears.

Prerequisite, Pomology 52.

79. **III.** General Pomology. — For seniors; juniors may elect. This course is planned to meet the needs of those students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. The work will consist of lectures and laboratory exercises on such topics

as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing.

2 class hours. 1 2-hour laboratory period, credit, 3.

Assistant Professor DRAIN.

80. **I.** SEMINAR. — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student will be assigned a major and a minor problem in lines of work in which he is particularly interested. He will pursue his studies both by reading and research, and the materials obtained will be worked into theses which will be presented to the seminar for discussion. Reports on minor problems will be taken up first. No lectures will be given, but seminar meetings will be held for one period each week.

Credit, 1.

Professor SEARS.

81. **II.** SEMINAR. — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.

Professor SEARS.

82. **III.** SEMINAR. — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.

Professor SEARS.

Drawing.

Elective Courses.

25.[1] **I.** FREE-HAND DRAWING. — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

3 2-hour laboratory periods, credit, 3.

26.[1] **II.** MECHANICAL DRAWING. — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.

27.[1] **III.** MECHANICAL DRAWING. — For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.

Prerequisite, Drawing 26.

[1] Given by Assistant Professor Harrison in 1918–19.

DIVISION OF SCIENCE.

Botany.

Professor Osmun, Associate Professor Anderson, Assistant Professor Clark, Mr. McLaughlin, ——, ——, ——.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Required Courses.

3. **III.** Morphology and Taxonomy of the Higher Plants (Phanerogamia). — Freshmen. Seeds and seedlings; types of leaves, stems, roots and flowers. Determination and naming of plants, using Gray's "New Manual of Botany." An herbarium of 75 species of plants is required of each student.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin and Mr. ——.

25. **I.** Anatomy, Physiology and Ecology of the Higher Plants. — Sophomores. Structure, functions, metabolism and environmental relations of seed plants.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin and Mr. ——.
Prerequisite, Botany 3.

Elective Courses.

26. **II.** Morphology and Taxonomy of the Lower Plants (Cryptogamia). — Sophomores. Systematic study of typical forms of bacteria, algæ, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are prerequisites of all subsequent work taken in the Department of Botany.)
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun, Mr. McLaughlin and Mr. ——.
Prerequisite, Botany 25.

50. **I.** Diseases of Crops. — For juniors; seniors may elect. The lectures are general and are taken by all who elect the course, but in order to permit students to specialize on the diseases of crops most closely related to their majors or in which they are most interested, the course is divided for laboratory work into the following sections: (1) diseases of truck and field crops; (2) diseases of floricultural crops and ornamentals; (3) diseases of fruit crops; (4) diseases of shade and forest trees; (5) general. The fifth section is for students who do not care to confine their study to the diseases of any special class of crops. One, two or three laboratory sections may be taken, but the fifth section cannot be taken in conjunction with any other.
1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.
Associate Professor Anderson and Mr. McLaughlin.
Prerequisite, Botany 26.

51. **II.** Diseases of Crops. — For juniors; seniors may elect. As stated under Course 50.
1 class hour. 1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.
Associate Professor Anderson and Mr. McLaughlin.
Prerequisite, Botany 50.

52. **I.** Systematic Mycology. — For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 26.

53. **II.** Systematic Mycology. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 52.

54. **III.** Systematic Mycology. — For juniors; seniors may elect. As stated under Course 52.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Anderson.
Prerequisite, Botany 53.

55. **I.** Plant Histology. — For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun and Mr. McLaughlin.
Prerequisite, Botany 26.

56. **II.** Plant Histology. — For juniors; seniors may elect. As stated under Course 55.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor Osmun and Mr. McLaughlin.
Prerequisite, Botany 55.

75. **I.** Plant Pathology. — Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 54.

76. **II.** Plant Pathology. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 75.

77. **III.** Plant Pathology. — Seniors. As stated under Course 75.
1 class hour. 4 2-hour laboratory periods, credit, 5.
Professor Osmun and Associate Professor Anderson.
Prerequisite, Botany 76.

78. **I.** Plant Physiology. — Seniors. Study of the factors and conditions of (*a*) Plant Nutrition, including the taking up of water and mineral substances, the assimilation of carbon and nitrogen, and the release of energy due to the processes of dissimilation; (*b*) Plant Growth, including the influence of internal and external factors on growth, the development of reproductive and vegetative organs, and touching on plant inheritance and the origin of new varieties; (*c*) Plant Movements, including those due to the taking up of water, and those movements of both motile and fixed forms in response to external stimuli. Special emphasis is laid on the development of skill in the manipulation of apparatus in the laboratory; weekly conferences are held at which students report on assignments to a large range of original papers.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisites, Botany 26 and Chemistry 51.

79. **II.** Plant Physiology. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisite, Botany 78.

80. **III.** Plant Physiology. — Seniors. As stated under Course 78.
2 class hours. 3 2-hour laboratory periods, credit, 5.
Assistant Professor Clark.
Prerequisite, Botany 79.

82. **II.** Cytology and Embryology. — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. McLaughlin.
Prerequisites, Botany 26 and 55.

83. **III.** Cytology and Embryology. — Seniors. As stated under Course 82.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Mr. McLaughlin.
Prerequisite, Botany 82.

86. **I.** Seminar. — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
1 class hour. Credit, 1.
The Department.

87. **II.** SEMINAR. — For seniors and graduate students. As stated under Course 86.
1 class hour. Credit, 1.
The DEPARTMENT.

88. **III.** SEMINAR. — For seniors and graduate students. As stated under Course 86.
1 class hour or 2 laboratory hours. Credit, 1.
The DEPARTMENT.

General and Agricultural Chemistry.

Professor LINDSEY, Professor WELLINGTON, Professor CHAMBERLAIN, Professor PETERS, Professor ——, Mr. SEREX, Mr. PRINCE and Mr. JONES.

[In teaching the courses in chemistry, emphasis is laid both on their educational and vocational value. The courses given in the freshman year are intended to deal with fundamental principles, and to give the student such an understanding of the subject as will enable him to apply it in farm practice. The more advanced courses, including quantitative analysis, organic, physiological and physical chemistry, are intended primarily for those who desire to get a fuller understanding of the subject, and who will use it both as teachers and workers in the allied sciences, or who desire to follow agricultural chemistry as a vocation. Advanced training is given by means of postgraduate courses for those who wish to become teachers, professors and research workers in chemistry.]

Required Courses.

1. **I.** GENERAL CHEMISTRY. — Freshmen. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." This course is for those students who do not present chemistry for entrance, and who begin the subject in college.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor PETERS, Mr. SEREX and Assistants.

2. **II.** GENERAL CHEMISTRY. — Freshmen. A continuation of Course 1. A study of metals and their compounds. The laboratory work is the same as described under Course 4.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor PETERS and Assistants.

3. **III.** INORGANIC AGRICULTURAL CHEMISTRY. — Freshmen. As stated under Course 5, **II.**
2 class hours. 1 2-hour laboratory period, credit, 3.
Mr. SEREX and Assistants.

4. **I.** ADVANCED GENERAL CHEMISTRY. — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.
2 class hours. 1 2-hour laboratory period, credit, 3.
Professor PETERS and Assistants.

Prerequisite, Entrance Chemistry.

5. **II.** Inorganic Agricultural Chemistry. — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides. The laboratory work is divided into three parts, as follows: (*a*) qualitative examination of soil, plant ash and superphosphate; (*b*) approximate quantitative determination of moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (*c*) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.

2 class hours. 1 2-hour laboratory period, credit, 3.

Mr. Serex and Assistants.

6. **III.** Organic Agricultural Chemistry. — Freshmen. The course embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar and alcohol. The treatment of the subject will be general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.

2 class hours. 1 2-hour laboratory period, credit, 3.

Professor Chamberlain and Assistants.

Elective Courses.

25. **I.** Qualitative Analysis. — *Basic.* — Sophomores. A course in the systematic analysis of metallic salts, presented from the ionic viewpoint. The student studies closely the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Stieglitz' "Qualitative Analysis" and Gooch & Browning's "Qualitative Analysis" for reference. This course should be taken, particularly, by all intending to follow chemistry as a vocation.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Mr. Serex.

Prerequisite, Chemistry 3 or 6.

26. **II.** Qualitative Analysis. — *Acidic.* — Sophomores. A continuation of Course 25.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Mr. Serex.

27. **III.** Quantitative Analysis. — For sophomores; juniors and seniors may elect. Instruction in this course includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.

1 class hour. 2 4-hour laboratory periods, credit, 5.

Professor Wellington and Professor Peters.

Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

30. **III.** Organic Agricultural Chemistry. —For sophomores; juniors and seniors may elect. As described in Course 6. To be elected by those who have not had Chemistry 6.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor Chamberlain.

51. **I.** Organic Chemistry. — For juniors; seniors may elect. This course consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates and proteins. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and is especially planned for those majoring in chemistry or the other sciences. Those electing Course 51 are expected to elect Course 52.
5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor Chamberlain.
Prerequisites, Chemistry 3 or 6, and Chemistry 27 for those majoring in chemistry.

52. **II.** Organic Chemistry. — For juniors; seniors may elect. A continuation of Course 51, dealing principally with compounds of the benzene series.
5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor Chamberlain.

62. **III.** Advanced Quantitative Analysis. — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27, together with the analysis of insecticides or the analysis of soils and fertilizers.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor Wellington and Professor Peters.
Prerequisite, Chemistry 27.

65. **III.** Physical Chemistry. —For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Mr. Serex.
Prerequisite, Chemistry 27.

76. **I.** Milk and Butter Analysis. — For seniors; juniors may elect. A study of chemical methods of analysis of milk and butter.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor Peters.
Prerequisite, Chemistry 27.

77. **II.** Cattle Feed, Water and Miscellaneous Analysis. — For seniors; juniors may elect. A study of methods of analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor Peters.
Prerequisite, Chemistry 27.

80. **I.** Physiological Chemistry. — Seniors. This course is intended to be supplementary to Courses 51 and 52. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it will give acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Chamberlain.

87. **III.** History of Chemistry. — Seniors. An exposition of the development of chemical knowledge from the earliest times to the present. Although the entire history will be included, the larger portion of it will receive only brief mention in order that the questions of vital interest in modern life and industry may be studied at greater length. Particular attention will be given to the questions of plant and animal industry. Chemists are strongly advised to take this course.

3 class hours. Credit, 3.

Professor Wellington.

90. **II.** Special Work in Agricultural Chemical Analysis. — Seniors. The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This is to acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

6 or 10 laboratory hours, credit, 3 or 5.

Professor Peters.

91. **III.** Special Work in Agricultural Chemical Analysis. — Seniors. As stated in Course 90.

10 laboratory hours, credit, 5.

Professor Peters.

Prerequisite, Chemistry 90.

92. **II.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. In this course, as in Courses 90 to 95, the student will be able to give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, dyes, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.

Professor Chamberlain.

Prerequisites, Chemistry 51, 52 and 80.

93. **III.** Special Work in Physiological and Organic Agricultural Chemistry. — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.
Professor Chamberlain.

Prerequisite, Chemistry 92.

94. **II.** Special Work in Physical Chemistry. — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student will select one line of work and follow it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.
Mr. Serex.

Prerequisite, Chemistry 65.

95. **III.** Special Work in Physical Chemistry. — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.
Mr. Serex.

Prerequisite, Chemistry 94.

Entomology.

Professor Fernald, Professor Crampton, Associate Professor Regan.

Elective Courses.

26. **II.** 27. **III.** General and Economic Entomology. — For sophomores; juniors and seniors may elect. This course is planned to meet the needs of students who desire some knowledge of insects, but who cannot give more than two terms to the subject. It also serves as an introduction to the later courses for those who intend to follow entomology farther. It touches briefly upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. During the winter term and in the spring term until about the first of May instruction is given by lectures and recitations; from about the first of May field work takes the place of the lectures. In this part of the course the students are shown how to find and recognize the work of the various insect pests which may be accessible at that season of the year, and they also make and preserve a collection of insects.

3 class hours. Credit, 3.
Professor Fernald.

27. **III.** General and Economic Entomology. — As stated under Course 26, **II.**

2 class hours till about May 1; thereafter 2 2-hour field periods. Credit, 2.
Professor Fernald, Professor Crampton and Associate Professor Regan.

50. **I.** Pests of Special Crops. — For juniors; seniors may elect. For students not majoring in entomology, and also for those majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student majoring in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals and man. This work may be continued in the winter term also. (See 51, **II.**)

3 2-hour laboratory periods, credit, 3.

Professor Fernald.

Prerequisites, Entomology 26 and 27.

51. **II.** Pests of Special Crops. — As stated in 50, **I.**

3 2-hour laboratory periods, credit, 3.

Professor Fernald.

Prerequisite, Entomology 50.

53. **I.** Insect Morphology. — For juniors; seniors may elect. For students majoring in entomology. The lectures of this course treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Professor Crampton.

Prerequisites, Entomology 26 and 27.

54. **II.** Insect Classification. — For juniors; seniors may elect. For students majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.

3 2-hour laboratory periods, credit, 3.

Associate Professor Regan.

Prerequisite, Entomology 53.

55. **III.** Economic Entomology. — For juniors; seniors may elect. Special studies on the most serious insect pests, their habits, nature of the injuries they cause and methods of control. In the lectures the composition, preparation and methods of application of the more important insecticides, their merits and defects, and studies of insecticide apparatus and other methods of control are treated. A portion of the laboratory time will be used in practical work on the topics taken up in the lectures.

1 class hour. 2 2-hour laboratory periods, credit, 3.

Professor Fernald, Professor Crampton and Associate Professor Regan.

Prerequisite, Entomology 54.

75. **III.** Forest and Shade-tree Insects. — For juniors; seniors may elect. The lecture work deals with the principles and methods of controlling insects which attack forests and forest products, shade trees, etc. The laboratory periods are devoted to a study of the more important species, their identification, biology and specific control measures. Field work will supplement laboratory study if time permits.

1 class hour. 3 2-hour laboratory or field periods, credit, 4.

Associate Professor Regan.

Prerequisites, Entomology 26 and 27; 53 and 54 desirable.

76. **I.** Advanced Entomology. — For seniors. During this year studies of scale insects (coccidology), life histories of important pests, the preparation of bibliographies, methods of rearing, photography of insects, methods for experimental work and record keeping, and studies of the early stages of insects will be given. Insects as disease carriers, insect bionomics, and a study of the animals not insects with which entomologists are expected to deal, will also be included in this course.

2 class hours. 3 2-hour laboratory periods, credit, 5.

Professor Fernald, Professor Crampton and Associate Professor Regan.

Prerequisite, Entomology 55.

77. **II.** Advanced Entomology. — As stated in Course 76, **I.**

3 2-hour laboratory periods, credit, 3.

Professor Fernald, Professor Crampton and Associate Professor Regan.

Prerequisite, Entomology 76.

78. **III.** Advanced Entomology. — As stated in Course 76, **I.**

1 class hour. 3 2-hour laboratory or field periods, credit, 4.

Professor Fernald, Professor Crampton and Associate Professor Regan.

Prerequisite, Entomology 77.

90. **II.** Evolution. — For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed.

3 class hours. Credit, 3.

Professor Crampton.

Mathematics and Civil Engineering.

Professor Ostrander, Associate Professor Machmer, Assistant Professor F. C. Moore,[1] Mr. Hazeltine.[2]

Required Courses.

1. **I.** Higher Algebra. — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Fite's "College Algebra."
5 class hours. Credit, 5.
The Department.

2. **II.** Higher Algebra. — As stated under Course 1.
2 class hours. Credit, 2.
The Department.

3. **III.** Solid Geometry. — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.
3 class hours. Credit, 3.
The Department.

5. **II.** Plane Trigonometry (in charge of Department of Physics). — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."
3 class hours. Credit, 3.
Professor Hasbrouck and Associate Professor Robbins.

6. **III.** Mensuration and Computation. — Freshmen. The course includes a review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements.
2 class hours. Credit, 2.
The Department.

---

[1] Temporary appointment.

[2] On leave of absence, 1918–19.

Elective Courses.

26. **II.** Plane Surveying. — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.
2 class hours. Credit, 2.
The Department.

27. **III.** Plane Surveying. — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.
3 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Mathematics 26.

50. **I.** Analytic Geometry. — For juniors; seniors may elect. A discussion of the geometry of the line, the circle of conic sections and of the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."
3 class hours. Credit, 3.
The Department.

Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II.** Differential and Integral Calculus. — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Granville's "Differential and Integral Calculus."
5 class hours. Credit, 5.
The Department.

Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III.** Integral Calculus. — For juniors; seniors may elect. A continuation of Course 51.
5 class hours. Credit, 5.
The Department.

Prerequisite, Mathematics 51.

53. **II.** Elementary Structures. — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.
3 class hours. 1 2-hour laboratory period, credit, 4.
The Department.

75. **I.** Hydraulics and Sanitary Engineering. — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.
5 class hours. Credit, 5.
The Department.

76. **I.** Materials of Construction, Foundations and Masonry Construction. — For seniors; juniors may elect. Textbook and lectures.
4 class hours. 1 2-hour laboratory period, credit, 5.
The Department.

77. **II.** Roads and Railroads. — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures.
3 class hours. Credit, 3.
The Department.

78. **III.** Roads and Railroads. — For seniors; juniors may elect. As stated under Course 77.
3 2-hour laboratory periods, credit, 3.
The Department.
Prerequisite, Mathematics 77.

79. **I.** Applied Mechanics. — Seniors. A course in applied mechanics, based on the calculus, with problems. Textbooks and lectures.
5 class hours. Credit, 5.
The Department.
Prerequisites, Mathematics 51, 52.

Microbiology.

Professor Marshall, Assistant Professor Itano, Mr. Hood,[1] Mr. Neill.

Elective Courses.

50. **I., II. and III.** Introductory and General Microbiology. — For juniors; seniors may elect. Aims to provide elementary basis for microbial studies and interpretation, to enable students to pursue special pertinent courses which will serve as supports in practical electives or majors, and to furnish students with such material as will be valuable in understanding public health problems. Three hours scheduled, five hours by arrangement.
2 class hours. 6 laboratory hours, credit, 5.
Professor Marshall, Assistant Professor Itano and Mr. Neill.

51. **II. and III.** Morphological, Cultural and Physiological Microbiology. — For juniors; seniors may elect. Types of micro-organisms, technic of handling, methods of culture and functions of micro-organisms are considered. This course is fundamental to all advanced and extended microbiological studies. One hour will be scheduled.
10 laboratory hours, credit, 5.
Assistant Professor Itano and Mr. Neill.

52. **III.** Advanced Morphological, Cultural and Physiological Microbiology. — For juniors; seniors may elect. The purpose of this course is to prepare the student for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technic and methods of culture, together with a more extensive knowledge of micro-organisms and their functions. One hour will be scheduled.
10 laboratory hours, credit, 5.
Assistant Professor Itano and Mr. Neill.
Prerequisite, Microbiology 50.

[1] On leave of absence, 1918–19.

75. **II.** Agricultural Microbiology. — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor Marshall, Assistant Professor Itano and Mr. Neill or Mr. Hood.

Prerequisite, Microbiology 50.

76. **III.** Agricultural Microbiology. — For seniors; juniors may elect. As stated under Course 75. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor Marshall, Assistant Professor Itano and Mr. Neill or Mr. Hood.

Prerequisites, Microbiology 50 and 75.

80. **II.** Soil Microbiology. — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention. One hour will be scheduled.

10 laboratory hours, credit, 5.

Assistant Professor Itano.

Prerequisite, Microbiology 50.

81. **I.** Hygienic Microbiology. — For seniors; juniors may elect. An attempt will be made to select for this course certain material which should be the possession of every individual, and which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antisepsis and asepsis, will be treated. One hour will be scheduled.

10 laboratory hours, credit, 5.

Professor Marshall and Mr. Hood, or Assistant Professor Itano and Mr. Neill.

Prerequisite, Microbiology 50.

82. **I.** Dairy Microbiology. — For seniors; juniors may elect. Special emphasis will be placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, clarification, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk;

bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.
Professor Marshall and Mr. Hood.

Prerequisite, Microbiology 50.

83. **I.** Food Microbiology. — For seniors; juniors may elect. A study of the principles of food preservation, and food preservation by means of drying, canning, refrigerating and addition of chemicals, will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased and poisonous foods, will receive consideration. Contamination of food supplies by means of water, sewage, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. Laboratory inspection of foods is now a subject of great import and will be given attention. One hour will be scheduled.

10 laboratory hours, credit, 5.
Professor Marshall and Mr. Hood.

Prerequisite, Microbiology 50.

Special Courses for Women.

1. **I.** Elementary Microbiology. — For freshmen. The course will be devoted to the various types of micro-organisms, their distribution in nature and their characterization. Such methods as are essential for examination, manipulation and culturing will be studied and employed.

6 laboratory periods, credit, 3.
Assistant Professor Itano and Mr. Neill.

In place of Military 1, tactics; Military 4, drill; fall term, freshmen.

3. **III.** Elementary Microbiology. — For freshmen. Continuation of 1.

4 laboratory periods, credit, 2.
Assistant Professor Itano and Mr. Neill.

In place of Military 3, tactics; Military 6, drill; spring term, freshmen.

25. **I.** Personal Hygiene. — For sophomores. Such subjects as the hygiene of the mouth and teeth, the gastro-intestinal tract, food, the skin, respiration apparatus, ear, eye and nervous system are reviewed. The value of bathing, clothing, physical exercise, etc., are considered. Attention will be given to emergencies, accidents of "first aid," and such other matters as usually fall within this category.

2 class hours, credit, 2.
Professor Marshall.

In place of Military 27, tactics; Military 28, drill; fall term, sophomores.

27. **III.** Sanitary Science. — For sophomores. The usual topics of sanitary science, as ventilation, heating, plumbing, water supply, sewage disposal, food control and communicable diseases, will be treated wholly from the standpoint of individual and public health control.

2 class hours, credit, 2.
Professor Marshall.

In place of Military 27; Military 30; spring term, sophomores.

Physics.

Professor Hasbrouck, Associate Professor Robbins, Mr. ——.

[The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry, zoölogy, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.]

Required Courses.

25. **I.** General Physics. — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinetics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours. 1 2-hour laboratory period, credit, 4.
Professor Hasbrouck and Associate Professor Robbins.

26. **II.** Electricity and Magnetism. — Sophomores. The work in electricity includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

2 class hours. 1 2-hour laboratory period, credit, 3.
Associate Professor Robbins.

Elective Courses.

27. **III.** Heat and Light. — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

4 class hours. 1 2-hour laboratory period, credit, 5.
Professor Hasbrouck and Associate Professor Robbins.

29. **III.** Industrial Electricity. — For sophomores; juniors and seniors may elect. Wiring and testing of commercial equipment, such as storage cells, dynamos, motors, engine ignitors and distributors, heaters, transformers, etc. Laboratory work, accompanied by notes and required reading. Elective only by arrangement with instructor.

1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 26.

50. **I.** Electricity, Heat and Light. — For juniors; seniors may elect.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 27.

51. **II.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Course 50.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 50.

52. **III.** Electricity, Heat and Light. — For juniors; seniors may elect. Continuation of Courses 50 and 51.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Associate Professor Robbins.

Prerequisite, Physics 51.

Veterinary Science.

Professor Paige, Associate Professor Gage.[1]

[The courses in veterinary science have been arranged to meet the needs of students who propose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

50. **I.** Veterinary Hygiene and Stable Sanitation. — For juniors; seniors may elect. This course is intended to familiarize the student with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.
5 class hours. Credit, 5.
Professor Paige.

51. **II.** General Veterinary Pathology. Materia Medica and Therapeutics. — For juniors; seniors may elect. In this course such fundamental and general pathological conditions are studied as inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in the diagnosis, prevention and treatment of disease. The course in pathology is followed by one in materia medica and therapeutics, dealing with the origin, preparation, pharmacology, pharmacy, administration and therapeutic use of the more common drugs. Poisonous plants and symptoms and treatment of plant poisoning are also considered.
5 class hours. Credit, 5.
Professor Paige.

75. **I.** Comparative (Veterinary) Anatomy. — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals compared with it where differences exist. This course is essential for those students wishing to elect Course 76.
5 class hours. Credit, 5.
Professor Paige.

[1] On leave of absence, 1918–19.

76. **II.** Theory and Practice of Veterinary Medicine; General, Special and Operative Surgery. — For seniors; juniors may elect. A course intended to familiarize the student with the various medical and surgical diseases of the different species of farm animals. Particular attention is given to diagnosis and first-aid treatment. The student is taught the technique of simple surgical operations that can with safety be performed by the stock owner. Lectures, demonstrations and practice. This course should be taken in conjunction with Course 51.

5 class hours. Credit, 5.

Professor Paige.

Prerequisite, Veterinary 75.

78.[1] **I.** Essentials of General Pathology. — For seniors; juniors may elect. This course is planned to introduce the student to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis will be considered in the laboratory. The various chemical and biological reactions and tests will be presented from the standpoint of pure science, showing applications of chemistry and biology. The course will serve to liberally educate and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

79.[1] **II.** Essentials of General Animal Pathology. — For seniors; juniors may elect. This is a continuation of Course 78, and is devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease will be considered.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

Prerequisite, Veterinary 78.

80.[1] **III.** Essentials of General Animal Pathology. — For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.

Associate Professor Gage.

Prerequisite, Veterinary 79.

85.[1] **I.** Avian Pathology. — For seniors; juniors may elect. A course in poultry diseases. The object of this course is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. The work will consist of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the

[1] Not given in 1918–19.

respiratory system, circulation and kidneys. The important disease-producing external and internal parasites will be considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.
Associate Professor GAGE.

86.[1] **II.** AVIAN PATHOLOGY. — For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases will be considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.
Associate Professor GAGE.

Prerequisite, Veterinary 85.

87.[1] **III.** AVIAN PATHOLOGY. — For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Associate Professor GAGE.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Professor GORDON, ——.

ZOÖLOGY.

Required Course.

25. **I.** PRINCIPLES OF ZOÖLOGY. — Sophomores.
2 class hours. 2 2-hour laboratory periods, credit, 4.
Professor GORDON and ——.

Elective Courses.

27. **III.** ELEMENTS OF MAMMALIAN ANATOMY. — Sophomores; juniors and seniors may elect.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Professor GORDON.

50. **I.** SYNOPTIC INVERTEBRATE ZOÖLOGY. — Juniors; seniors may elect.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 25.

51. **II.** SYNOPTIC INVERTEBRATE ZOÖLOGY. — Juniors; seniors may elect. Continuation of Course 50.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 50.

[1] Not given in 1918–19.

52. **III.** Synoptic Invertebrate Zoölogy. — Juniors; seniors may elect. Continuation of Course 51.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Prerequisite, Zoölogy 51.

53. **I.** Elements of Microscopic Technique. — Juniors; seniors may elect.
3 2-hour laboratory periods, credit, 3.
Professor Gordon.

54. **II.** Elements of Histology. — Juniors; seniors may elect.
3 2-hour laboratory periods, credit, 3.
Professor Gordon.

Prerequisite, Zoölogy 53.

55. **III.** Elements of Histology. — Juniors; seniors may elect.
3 2-hour laboratory periods, credit, 3.
Professor Gordon.

Prerequisite, Zoölogy 54.

58. **II.** Conservational Zoölogy. — Juniors; seniors may elect. For students who are interested in the conservation of wild life, especially the natural fauna of the State. Not offered for the year 1919–20.
2 class hours. 1 2-hour laboratory period, credit, 3.
The Department.

75. **I.** Special Zoölogy. — Juniors, seniors, graduates and others may apply for such special work as they are qualified to undertake.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

76. **II.** Special Zoölogy. — Same as Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

77. **III.** Special Zoölogy. — Same as Course 75.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

78. **II.** Ornithology. — Juniors, seniors and others. The taxonomic characters, migrations and distribution of the birds.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

79. **III.** Economic and Field Ornithology. — A review and study in the field of the food and other habits of Massachusetts birds.
1 class hour. 2 2-hour laboratory periods, credit, 3.
The Department.

Geology.

Required Course.

2. **II.** Agricultural Geology. — Freshmen.

2 class hours. Credit, 2.

Professor Gordon.

Elective Course.

27. **III.** General Geology. — Sophomores; juniors and seniors may elect.

3 class hours. 2 2-hour laboratory periods, credit, 5.

Professor Gordon.

DIVISION OF THE HUMANITIES.

Professor SPRAGUE.

Economics and Sociology.

Professor SPRAGUE.

[The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.]

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Elective Courses.

26. **II.** CIVILIZATIONS, ANCIENT AND MODERN. — For sophomores; others may elect. This course studies the evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.
5 class hours. Credit, 5.
Professor SPRAGUE.

50. **II.** BUSINESS AND INDUSTRY. — For juniors and seniors. The forms, organization, administration and labor problems of business. This course is devoted to the following subjects: methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, co-operation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.
5 class hours. Credit, 5.
Professor SPRAGUE.

51. **I.** INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS. — For juniors. This course is devoted to the study of the following subjects: definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which govern them; principles of spending, economy, luxury, conservation of individual and national resources;

principles and agencies for saving, investments, banks, building associations, insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.
5 class hours. Credit, 5.
Professor SPRAGUE.

75. **I.** SOCIAL INSTITUTIONS AND SOCIAL REFORMS. — For seniors; juniors by permission. This course is devoted to the study of the social institutions, such as the family, the State, property, religions; and to such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts will be studied in considerable detail.
5 class hours. Credit, 5.
Professor SPRAGUE.

77. **III.** PUBLIC FINANCE, TAXATION, MONEY AND BANKING. — For seniors. This course studies systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.
5 class hours. Credit, 5.
Professor SPRAGUE.

History and Government.

Elective Courses.

50. **III.** GOVERNMENT. — For juniors; seniors may elect. This course will cover subjects as follows: forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control over broader interests of the people.
5 class hours. Credit, 5.
Professor SPRAGUE.

75. **II.** HISTORY OF NEW ENGLAND. — For seniors; juniors may elect. Treating New England as a geographical and political unit, this course aims to give a survey of its religious, social, economic and political history. The development of its institutions, the growth of its industries, the spread of its population to other sections of the country, its influence upon national character and politics are phases of the subject which will be discussed. Assigned readings and theses will be required.
3 class hours. Credit, 3.
Miss JEFFERSON.

Languages and Literature.

Professor Lewis, Associate Professor Neal, Associate Professor Ashley, Associate Professor Mackimmie, Assistant Professor Prince, Assistant Professor Patterson, Miss Goessmann, Mr. Julian, Mr. Rand. [1]

English.

Required Courses.

1. **I.** 2. **II.** 3. **III.** English. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences.
3 class hours each term. Credit, 3 each term.
Assistant Professor Prince, Associate Professor Neal, Assistant Professor Patterson and Mr. Rand.

25. **I.** 26. **II.** 27. **III.** English. — Sophomores. A general reading course in English literature.
2 class hours each term. Credit, 2 each term.
Professor Lewis and Miss Goessmann.

Elective Courses in English Language and Literature.

[The elective courses in English fall into two groups. Both groups are intended to increase the student's understanding and appreciation of literature. Group one (Courses 50 to 58) will, besides introducing the student to individual writers, emphasize the life and thought of the times. Group two (Courses 75, 79 and 80) will emphasize form-characteristics and the artistic quality or historical development of literary types.]

50. **I.** English Poetry of the Romantic Period (1919–20). — This course alternates with Course 53. For juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Coleridge, Wordsworth, Keats, Shelley, Scott and Byron.
3 class hours. Credit, 3.
Assistant Professor Patterson.

51. **II.** English Poetry in the Nineteenth Century (1920–21). — This course alternates with Course 54. For juniors; seniors may elect. In general, this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, the Rossettis and Morris, Swinburne and Clough are among the writers to be studied.
3 class hours. Credit, 3.
Professor Lewis.

57. **III.** English Poetry in the Nineteenth Century (1920–21). — This course alternates with Course 58. For juniors; seniors may elect. As stated under Course 51.
2 class hours. Credit, 2.
Professor Lewis.

Prerequisite, English 51.

[1] On leave of absence, 1918–19.

52. **III.** English Writers from Milton to Pope (1920–21). — For juniors; seniors may elect. A survey course that will emphasize the leading writers of the period, including Milton, Dryden, Addison, Swift and Pope.
3 class hours. Credit, 3.
Assistant Professor Patterson.

53. **I.** English Prose of the Romantic Period (1920–21). — For juniors; seniors may elect. A course in English prose paralleling Course 51. Some of the writers studied are Goldsmith, Coleridge, Lamb, DeQuincey and Hazlitt.
3 class hours. Credit, 3.
Assistant Professor Patterson.

54. **II.** English Prose in the Nineteenth Century (1919–20). — For juniors; seniors may elect. This course parallels Course 51. Among the writers considered will be Macaulay, Carlyle, Ruskin, Newman and Arnold.
3 class hours. Credit, 3.
Professor Lewis.

58. **III.** English Prose in the Nineteenth Century (1919–20). — For juniors; seniors may elect. As stated under Course 54.
2 class hours. Credit, 2.
Professor Lewis.

Prerequisite, English 54.

55. **II.** American Literature. — For juniors; seniors may elect. Intended to give a general survey of literature in America, especially in the nineteenth century, with an introduction to the work of the best known writers, and with especial attention to the relations between national life and history and national thought as expressed in literature. The usual authors — Irving, Cooper, Bryant, Poe, Longfellow, Emerson, Hawthorne, Whittier, Parkman, Lowell, Holmes, Whitman, Lanier — will be discussed, and attention will be given to southern and western authors. Present writers and tendencies will also receive some notice.
3 class hours. Credit, 3.
Assistant Professor Prince.

56. **III.** American Literature. — For juniors; seniors may elect. As stated under Course 55.
2 class hours. Credit, 2.
Assistant Professor Prince.

Prerequisite, English 55.

60. **I.** The Literature of Rural Life. — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities.
3 class hours. Credit, 3.
Miss Goessmann.

61. **II.** The Literature of Rural Life. — For juniors; seniors may elect. As stated under Course 60.
2 class hours. Credit, 2.
Miss Goessmann.

Prerequisite, English 60.

75. **III.** Prose Fiction. — The short story or the novel. Seniors; juniors may elect. Readings, reports and discussions. Texts (short story): Neal's "Short Stories in the Making" and "To-day's Short Stories Analyzed."
3 class hours. Credit, 3.
Associate Professor Neal.

79. **II.** The Drama. — For seniors; juniors may elect. A cursory survey of early English drama, its origin, forms and meaning, will be followed by a careful study of Shakespeare. Four of his plays will be analyzed in detail, and many others will be read and discussed. [Not given in 1918–19.]
3 class hours. Credit, 3.
Mr. Rand.

80. **III.** The Drama. — For seniors; juniors may elect. The course will trace the development of modern drama, especial attention being given to plays by Congreve, Goldsmith, Sheridan, Robertson, Jones, Pinero, Fitch, Shaw, Moody and Ibsen. [Not given in 1918–19.]
2 class hours. Credit, 2.
Mr. Rand.

Prerequisite, English 79.

Rural Journalism and Advanced Composition.

[The courses in journalism are intended to acquaint the student with the elementary problems and theory of journalism, and to exercise him in the commoner aspects of journalistic work, such as news-gathering and news-writing, desk-editing and editorial writing, and to do so especially with a view to preparing him for agricultural journalism and country or non-urban newspaper work. They also afford effective practice in advanced composition.]

Elective Courses.

50. **I.** Foundations of Writing: Exposition. — For juniors; seniors may elect. Advanced composition; planning expository thought; expository structure; specimens, including contemporary articles from farm and rural life publications; some bulletin writing, including presentation of technical information for nontechnical readers.
3 class hours. Credit, 3.
Associate Professor Neal.

51. **II.** Foundations of Writing: Narration and Description. — For juniors; seniors may elect. The fundamental elements of style, word-choice, diction, sentence form and paragraph types. Description of persons, places, objects, industries and productional processes, the temper and characteristic aspects of public gatherings, moods, behavior and character-sketching. Narration of incident, sustained action, events in series and the like, as in biography, dramatic situation, history and fiction.
3 class hours. Credit, 3.
Associate Professor Neal.

52. **III.** Foundations of Writing: Magazine Writing. — [Not given in 1918–19.]
3 class hours or equivalent in laboratory. Credit, 3.
Associate Professor Neal.
Prerequisite, one or more junior courses in journalism, or experience in journalistic work.

53. **I.** 54. **II.** 55. **III.** News-gathering and News-writing. — For juniors; seniors may elect. The foundation aims and conceptions of journalism; reporting. Central purpose, to develop ability to pick out essentials from inessentials, perceive elements of interest, and present facts which appeal to the reader. This course and Courses 54 and 55 are suited to nonmajoring students whose vocation will require the popular presentation of technical or other information; *e.g.*, extension workers, county agents, agricultural school instructors, experiment-station editors, survey and other social service workers, men engaged in sociological or economic investigations, landscape architects and civil and sanitary engineers. [Not given in term I. or term II., 1918–19.]
6 laboratory hours, credit, 3.
Associate Professor Neal.

77. **I.** 78. **II.** 79. **III.** Editorial Materials and Methods. — For seniors; juniors may elect. Readings, quizzes, reports and personal conferences; regular reading of one daily paper and one weekly review or rural life periodical; writing of editorial articles; current events or history. Recommended to nonmajoring students who desire practice in discovering the significant aspects of matters of public attention and in effectively expressing comment thereon. [Not given in term I. or term III., 1918–19.]
6 laboratory hours, credit, 3.
Associate Professor Neal.

80. **I.** 81. **II.** 82. **III.** Advanced Journalistic Practice. — Seniors. Preparation, editing and publication of a rural-life page or periodical. [Not given in 1918–19.]
8 or 10 laboratory hours, credits, 4 or 5.
Associate Professor Neal.

Public Speaking.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Public Speaking. — Freshmen. Freshmen public speaking is required in the first, second or third term, at the option of the instructor. The course is concerned with the actual problems which confront the man who would speak convincingly and persuasively. Much attention, therefore, is given to the preparation and delivery of extempore speeches. Textbook, Robinson's "Effective Public Speaking," supplemented by class work and discussions. First, second or third terms, as directed.
1 class hour. Credit, 1.
Assistant Professor Prince, Assistant Professor Patterson and Mr. Rand.

Elective Courses.

50. **I.** Argumentation. — For juniors; seniors may elect. The course aims to present the fundamental principles of argumentation as applied to oral and written discourse, and intends to develop in the student power to handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. Textbook, Foster's "Argumentation and Debating." The course is recommended for those who desire to enter the intercollegiate debates.
3 class hours. Credit, 3.
Assistant Professor Prince.

Prerequisites, Public Speaking, 1, 2 or 3.

51. **II.** Occasional Oratory. — For juniors; seniors may elect. The course involves a study of the elements of vocal expression and action; speeches on assigned subjects; prescribed reading; the preparation and delivery of several formal orations. Textbook, Shurter's "The Rhetoric of Oratory." The course is recommended for those who wish to enter the Flint contest.
3 class hours. Credit, 3.
Assistant Professor Prince.

Prerequisites, Public Speaking 1, 2 or 3.

French and Spanish.

Associate Professor Mackimmie, ——.

French.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Elementary French. — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. This course is required of freshmen presenting German for entrance who do not continue that language and have not studied French.
3 class hours each term. Credit, 3 each term.

4. **I.** 5. **II.** 6. **III.** Intermediate French. — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.
3 class hours each term. Credit, 3 each term.
Associate Professor Mackimmie.

Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

Elective Courses.

25. **I.** Intermediate French. — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisites, French 1, 2 and 3.

26. **II.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, French 25.

27. **III.** Intermediate French. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, French 26.

28. **I.** Advanced French. — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and Harper's "Masters of French Literature;" readings in the library and written reports.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6.

29. **II.** Advanced French. — For sophomores; open upon arrangement to other students. As stated under Course 28.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6.

30. **III.** Advanced French. — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods will be studied in class. Outside reading will be required.
3 class hours. Credit, 3.

Prerequisites, French 25 and 26, or French 28 and 29.

50. **I.** Scientific French. — For juniors; seniors may elect. This course is planned to meet the requirements of the individual student, and aims to equip him with exact English equivalents for the French scientific terms in his particular science. Word lists of scientific terms will be required, and also weekly readings and reports from scientific works in the subject in which he is majoring. Several scientific readers will be read.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II.** Scientific French. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III.** SCIENTIFIC FRENCH. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I.** FRENCH LITERATURE. — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements in French literature. Course 75 will deal with the drama, and plays by Augier, A. Dumas, fils, Delavigne and some contemporary dramatists will be read and studied.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II.** FRENCH LITERATURE. — For seniors; juniors may elect. This course deals with the novel. Works by Flaubert, the De Goncourts and Zola will be read. Written reports are required on outside reading.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III.** FRENCH LITERATURE. — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries du Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Littérature Française."
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

SPANISH.

Elective Courses.

50. **I.** ELEMENTARY SPANISH. — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.

51. **II.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 50.

52. **III.** ELEMENTARY SPANISH. — For juniors; open to other students upon arrangement. As stated in Course 50.
3 class hours. Credit, 3.
Associate Professor MACKIMMIE.
Prerequisite, Spanish 51.

75. **I.** Modern Spanish Authors. — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 52.

76. **II.** Modern Spanish Authors. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 75.

77. **III.** Modern Spanish Authors. — Seniors. As stated in Course 75.
3 class hours. Credit, 3.
Associate Professor Mackimmie.

Prerequisite, Spanish 76.

German and Music.

Associate Professor Ashley, Mr. Julian.

German.

Required Courses.

1. **I.** 2. **II.** 3. **III.** Elementary German. — Freshmen; open upon arrangement to other students. Grammar composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.
3 class hours, each term. Credit, 3 each term.
Associate Professor Ashley and Mr. Julian.

4. **I.** 5. **II.** 6. **III.** Intermediate German. — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.
3 class hours each term. Credit, 3 each term.
Associate Professor Ashley.

Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

Elective Courses.

25. **I.** Intermediate German. — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisites, German 1, 2 and 3.

26. **II.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 25.

27. **III.** Intermediate German. — For sophomores; open upon arrangement to other students. As stated under Course 25.
3 class hours. Credit, 3.
Mr. Julian.

Prerequisite, German 26.

28. **I.** Advanced German. — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literary productions.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6.

29. **II.** Advanced German. — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 28.

30. **III.** Advanced German. — For sophomores; open upon arrangement to other students. As stated under Course 29.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 29.

50. **I.** Scientific German. — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 50.

52. **III.** Scientific German. — For juniors; seniors may elect. As stated under Course 50.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 51.

75. **I.** German Literature. — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust" and one modern typical drama.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisites, German 28, 29 and 30.

76. **II.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 75.

77. **III.** German Literature. — Seniors. As stated under Course 75.
3 class hours. Credit, 3.
Associate Professor Ashley.

Prerequisite, German 76.

78. **I.** Conversation and Composition. — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.
1 class hour. Credit, 1.
Associate Professor Ashley.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.

Prerequisite, German 78.

80. **III.** Conversation and Composition. — For seniors; juniors may elect. As stated under Course 78.
1 class hour. Credit, 1.
Associate Professor Ashley.

Prerequisite, German 79.

Music.

Elective Courses.

50. **I.** History and Interpretation of Music. — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.
1 class hour. Credit, 1.
Associate Professor Ashley.

51. **II.** History and Interpretation of Music. — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.
1 class hour. Credit, 1.
Associate Professor Ashley.

52. **III.** History and Interpretation of Music. — For juniors; seniors may elect. The Modern school and Modern composers.
1 class hour. Credit, 1.
Associate Professor Ashley.

DIVISION OF RURAL SOCIAL SCIENCE.

President Butterfield.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor Cance, Mr. Sawtelle.

Required Course.

26. **II.** Agricultural Industry and Resources. — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.
5 class hours. Credit, 5.
Professor Cance.

Elective Courses.

50. **I.** Elements of Agricultural Economics. — For juniors; seniors may elect. This course is designed to accompany or follow the course in elements of economics. It deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.
5 class hours. Credit, 5.
Professor Cance.

51. **III.** Historical and Comparative Agriculture. — For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.
5 class hours. Credit, 5.
Mr. Sawtelle.

52. **II.** Co-operation in Agriculture. — For juniors; seniors may elect. The course treats of the history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements;

(2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.

5 class hours. Credit, 5.

Professor CANCE and Mr. SAWTELLE.

53. **III.** THE AGRICULTURAL MARKET. — For juniors; seniors and graduate students may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.

5 class hours. Credit, 5.

Professor CANCE.

76. **II.** TRANSPORTATION OF AGRICULTURAL PRODUCTS. — For seniors and graduate students; juniors may elect. This course deals with transportation in the United States, covering highways, waterways, railways and electric ways, with reference to the facilities for and cost of transporting farm products, opening up new agricultural areas or industries, and contributing to the wealth and welfare of the agricultural population. Lectures, text and field work.

5 class hours. Credit, 5.

Professor CANCE.

77. **I.** PROBLEMS IN AGRICULTURAL ECONOMICS. — For seniors and graduate students; juniors may elect. An advanced course for students desirous of studying more intensively some of the economic problems affecting the farmer. Some of these are: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest.

5 class hours. Credit, 5.

Professor CANCE and Mr. SAWTELLE.

78. **III.** AGRICULTURAL CREDIT FACILITIES. — For seniors and juniors. The legitimate use of credit in the production, storing and marketing of agricultural products. A brief survey of the development of credit institutions, National and State rural credit laws. Farm land banks, credit associations, and other means of securing personal credit. The topics will be discussed from the standpoints of dealers in agricultural produce, the landowning farmer, the tenant and the farm laborer; special attention will be given to the credit needs of the college graduate.

3 class hours. Credit, 3.

Mr. SAWTELLE.

80. **I.** Seminar. — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged.

1 2-hour conference period, credit, 1 or 2.
The Department.

81. **II.** Seminar. — For seniors and graduate students. As stated in Course 80.

1 2-hour conference period, credit, 1 or 2.
The Department.

82. **III.** Seminar. — For seniors and graduate students. As stated in Course 80.

1 2-hour conference period, credit, 1 or 2.
The Department.

Agricultural Education.

Professor Hart, Mr. Heald.[1]

Elective Courses.

[For the State teachers' certificate, a minimum of four courses in Agricultural Education is necessary.]

50. **I.** Educational Psychology. — For juniors; sophomores and seniors may elect. Work planned primarily for candidates for teaching. Consists of a study of the mental growth and development, and some correlations of the mind and nervous system.

5 periods, credit, 5.
Professor Hart.

51. **II.** Principles and Methods of Teaching. — For juniors and seniors. A study of the laws of learning, qualifications of teachers, class management and organization of subject-matter as applied to agriculture and related subjects.

5 periods, credit, 5.
Professor Hart.

52. **III.** History and Philosophy of Education. — For juniors and seniors. A study of educational history in modern times, educational movements in the United States and their bearing on national aims and ideals.

5 periods, credit, 5.
Professor Hart.

75. **I.** Organization and Supervision of Secondary Education. — For seniors; juniors may elect. School systems, courses of study, training of teachers, financial support, recent tendencies and policies in secondary schools.

3 periods, credit, 3.
Professor Hart.

---

[1] Representing the State Board of Education in the administration of the Smith-Hughes Act.

76. **II.** Special Methods in Vocational Agriculture. — For seniors and graduates. Consists of the outlining of lessons, outlining projects for agricultural teaching and applications of the principles of vocational education as embodied in the Smith-Hughes Act, and other legislation relative to agricultural education.

3 periods, credit, 3.
Professor Hart.

77. **III.** County Agent Work. — For seniors. Work on special agricultural problems by individual students; preparation and presentation of a number of theses, using charts and other apparatus. Major advisers will be responsible for accuracy of subject-matter; the Department of Agricultural Education will be responsible for preparation and presentation.

5 periods, credit, 5.
Professor Hart.

80. **I., II., III. and IV.** Teacher-training Course. — For seniors and graduate students. Work will consist of supervised apprentice teaching accompanied by arranging subject-matter for lessons and outlining projects, and professional study.

Credits 1 to 5 based on the number, character and length of teaching exercises and conferences. The Department in co-operation with the State Board of Education.

77. **II.** Extension and County Agent Work. — For seniors. The course consists chiefly of library research work. Each student will be required to produce one or more complete lectures under guidance both as to method of preparation and subject-matter, and one or more demonstrations. These lectures will be presented to public audiences in the presence of a board of critics. Some instruction will be given in organization and administration of the Extension Service. The Extension Service will be responsible for the public presentation and criticism. The student's major adviser will be responsible for the accuracy of the subject-matter. The Department of Agricultural Education will be responsible for the preparation of the lectures.

2 class hours. 4 2-hour laboratory periods, credit, 5.
Professor Hart.

78. **III.** Extension and County Agent Work. — For seniors. As stated under Course 77.

2 class hours. 4 2-hour laboratory periods, credit, 5.
Professor Hart.

Rural Sociology.

Professor Phelan, President Butterfield,[1] Professor Hart, Mr. Novitski.

Required Course.

27. **III.** Elements of Rural Sociology. — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific

[1] On leave of absence, 1919.

and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, an analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.

3 class hours. Credit, 3.

Professor PHELAN and Mr. NOVITSKI.

Elective Courses.

50. **I.** SOCIAL CONDITION OF RURAL PEOPLE. — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent and causes of rural delinquency and dependency, conditions of temperance, of sexual morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours. Credit, 3.

Professor PHELAN.

51. **II.** RURAL GOVERNMENT. — For juniors; seniors may elect. A general survey of the development of rural government in the United States, origin of the New England town, its influence upon the west, advantages, development of efficiency, county government, the influence of the farmer in legislation, good roads movement, credit facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours. Credit, 3.

Professor PHELAN and Mr. NOVITSKI.

52. **III.** RURAL ORGANIZATION. — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities.

3 class hours. Credit, 3.

President BUTTERFIELD.

75. **I.** Farmers' Organizations. — For seniors; juniors may elect. The history, purposes and achievements of the grange, the Farmers' Union, farmers' clubs, village improvement associations, boys' clubs, etc.; the method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.
3 class hours. Credit, 3.
Professor Phelan.

76. **I.** Field Work in Rural Sociology. — For seniors; juniors may elect. This course is designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work will be carried on in co-operation with the various college agencies engaged in rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.
From 2 to 6 laboratory hours, credits, 1 to 3.
Professor Phelan.
Prerequisites, Rural Sociology 27 and 52.

77. **II.** Rural Social Surveys. — For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.
3 class hours. Credit, 3.
Professor Phelan.

78. **II.** Rural and Business Law. — For seniors; juniors may elect. The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.
5 class hours. Credit, 5.
Professor Hart.

79. **I.** Seminar. — Credits, 1 to 3. Professor Phelan.

80. **II.** Seminar. — Credits, 1 to 3. Professor Phelan.

81. **III.** Seminar. — Credits, 1 to 3. Professor Phelan.

Rural Home Life.

Miss Skinner.

Elective Courses.

25. **I.** 26. **II.** 27. **III.** Textiles and Clothing. — Sophomores. The selection and purchase of suitable materials, their character, cost and durability. Appropriateness and simplicity in dress. There will be practical

work in hand and machine sewing, drafting and designing of patterns, the care and repair of clothing.
1 lecture. 2 2-hour laboratory periods, credit, 3.

---

50. **I.** 51. **II.** 52. **III.** Foods and Cookery. — Juniors. A course to establish a fundamental knowledge of foods. The lectures deal with a discussion of the comparative composition, cost and economic value of foodstuffs; their sources, production and manufacture. Laboratory practice in applying scientific principles to the selection and preparation of typical foods.
1 class hour. 2 2-hour laboratory periods, credit, 3.
Miss Skinner.

75. **I.** 76. **II.** Household Management. — Seniors. This course deals with the application of the principles of scientific management to the household, and the elements of successful home making. It includes a study of the family income, cost of living, household accounts, the budget and its apportionment. Consideration will also be given to the responsibility of the woman to her family and the community in establishing right standard of living.
2 class hours. Credit, 2.
Miss Skinner.

78. **III.** Home Nursing. — Seniors. This course includes a study of the care of the family health; simple diseases and their prevention; the care of young children and invalids; first aid to the injured.
2 class hours. Credit, 2.
Miss Skinner.

GENERAL DEPARTMENTS.

Military Science and Tactics.

Col. R. H. Wilson, U. S. A., retired; Ordnance Sergeant J. J. Lee, U. S. A., retired.

A Reserve Officers Training Corps was established at this college pursuant to paragraph IX., Bulletin 6, Jan. 29, 1917. Instruction in military science and tactics of an infantry unit of the Reserve Officers Training Corps was begun on April 1, 1917, and has been continued during the year, following the course of training prescribed for infantry units of the senior division in General Orders No. 49, War Department, Sept. 20, 1916.

The Department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-year course must take for three years three full hours a week of physical training. This work must be under college supervision. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the practical courses (drill) in military science are given in the first and third terms; the corresponding courses in physical education in the second term.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor.

Members of the Reserve Officers Training Corps who elect the advanced courses and are recommended by the President and the commandant, may take the course prescribed for the Reserve Officers Corps by entering a training company for six months, being paid at the rate of $100 per month while attending the camp. They obligate themselves to serve in the Reserve Officers Corps for ten years, receiving pay of their rank when called into the service of the United States for any duty.

The required uniform is of olive drab woolen cloth, furnished by the government. It is worn by all cadets when on military duty, and may be worn at other times, and will be considered the property of the United States for one scholastic year. In case a student leaves college before graduation he is required to turn in his uniform.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Required Courses.

1. **I.** Tactics. — Freshmen. Theoretical instruction through the school of the soldier, squad and company. Lectures on military subjects.
1 class hour. Credit, 1.
Colonel Wilson.

2. **II.** Tactics. — Freshmen. As stated under Course I.
1 class hour. Credit, 1.
Colonel Wilson.

3. **III.** Tactics. — Freshmen. Theory of target practice, map reading, service of security. Personal hygiene.
1 class hour. Credit, 1.
Colonel Wilson.

4. **I.** Drill. — Freshmen. Practical instruction in Infantry Drill Regulations, school of the soldier, squad and company, close and extended order. Preliminary instruction, position, sighting and aiming drills. Gallery practice.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

5. **II.** Drill. — Freshmen. Physical drill, Koehler's Manual. Gallery practice.
1 class hour. Credit, 1.
Professor Hicks and Sergeant Lee.

6. **III.** Drill. — Freshmen. As stated under Course 4.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

25. **I.** Tactics. — Sophomores. United States Infantry Drill Regulations, to include school of the battalion and combat. Small-arms firing regulations. Lectures, map reading, camp sanitation and camping expedients.
1 class hour. Credit, 1.
Colonel Wilson.

26. **II.** Tactics. — Sophomores. As stated under Course 25.
1 class hour. Credit, 1.
Colonel Wilson.

27. **III.** Tactics. — Sophomores. Lectures on military history, service of information and security, marches and camps.
1 class hour. Credit, 1.
Colonel Wilson.

28. **I.** Drill. — Sophomores. Infantry Drill Regulations to include school of the battalion, ceremonies, first-aid instruction. Range and gallery practice, and combat firing.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

29. **II.** Drill. — Sophomores. Physical drill, Koehler's Manual. Gallery practice.
1 class hour. Credit, 1.
Professor Hicks and Sergeant Lee.

30. **III.** Drill. — Sophomores. As stated under Course 28.
1 class hour. Credit, 1.
Colonel Wilson and Sergeant Lee.

Elective Courses.

50. **I.** Military Science. — Juniors. Minor tactics; field orders (studies in minor tactics); map maneuvers.
1 class hour. Credit, 3.
Colonel Wilson.

51. **II.** Military Science. — Juniors. Minor tactics; elements of international law; property accountability; method of obtaining supplies and equipment.
3 class hours. Credit, 3.
Colonel Wilson.

52. **III.** Military Science. — Juniors. As stated under Course 51.
3 class hours. Credit, 3.
Colonel Wilson.

53. **I.** Drill. — Juniors. Duties consistent with rank as cadet officers or noncommissioned officers in connection with the practical work and exercises laid down for the unit.
2 drill hours. Credit, 1.
Colonel Wilson and Sergeant Lee.

54. **II.** Drill. — Juniors. As stated under Course 53.
2 drill hours. Credit, 1.
Colonel Wilson and Sergeant Lee.

55. **III.** Drill. — Juniors. As stated under Course 53.
2 drill hours. Credit, 1.
Colonel Wilson and Sergeant Lee.

75. **I.** Military Science. — Seniors. Tactical problems, small forces, all arms combined; map maneuvers; court-martial proceedings.
3 class hours. Credit, 3.
Colonel Wilson.

76. **II.** Military Science. — Seniors. International relations of America from discovery to present day, and gradual growth of principles of international law, embodied in American diplomacy, legislation and treaties.
3 class hours. Credit, 3.
Colonel Wilson.

77. **III.** Military Science. — Seniors. Lectures on psychology of war and general principles of strategy.
3 class hours. Credit, 3.
Colonel Wilson.

78. **I.** Drill. — Seniors. As stated under Course 53.
2 drill hours. Credit, 1.
Colonel Wilson and Sergeant Lee.

79. **II.** Drill. — Seniors. As stated under Course 53.
2 drill hours. Credit, 1.
Colonel Wilson and Sergeant Lee.

80. **III.** Drill. — Seniors. As stated under Course 53.
2 drill hours. Credit, 1.
Colonel Wilson and Sergeant Lee.

Officers and noncommissioned officers conduct drill of lower classes. Field officers and captains are appointed from this class. The positions in every case are obtained by competition. It is to be understood that cadets obtaining these positions will be reported to the Adjutant-General of the army as distinguished cadets.

Physical Education and Hygiene.

Professor Hicks, Assistant Professor Gore, Mrs. Hicks,[1] Mr. Dickinson.[2]

[All classified undergraduate male students are given a physical examination upon entering.]

Men.

Required Courses.

1. **I.** Hygiene. — Freshmen. Lectures on personal hygiene.
1 class hour. Credit, 1.
Professor Hicks.

2. **I.** Recreation. — Freshmen. Outdoor games.
1 laboratory hour. Credit, third term.
Mr. Dickinson.

3. **III.** Recreation. — Freshmen. Outdoor games.
1 laboratory hour. Credit for Nos. 2 and 3, 1.
Mr. Dickinson.

25. **I.** Recreation. — Sophomores. Outdoor games.
1 laboratory hour. Credit, third term.
Mr. Dickinson.

26. **III.** Recreation. — Sophomores. Outdoor games.
1 laboratory hour. Credit for Nos. 25 and 26, 1.
Mr. Dickinson.

Course Elective during Emergency.

51. **II.** Gymnastics. — Juniors not members of Reserve Officers Training Corps.
2 laboratory hours. Credit, 1.
Professor Hicks.

Elective Course.

77. **III.** Training Course. — Seniors. Election by permission only. History of physical education and supervision of athletics.
1 class hour. Credit, 1.
Professor Hicks.

[1] Temporary appointment. [2] Temporary substitute.

WOMEN.

Required Courses.

4. **I.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

5. **II.** GYMNASTICS. — Freshmen. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

6. **III.** RECREATION. — Freshmen. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

27. **I.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

28. **II.** GYMNASTICS. — Sophomores. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

29. **III.** RECREATION. — Sophomores. Outdoor games.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

Elective Courses.

50. **II.** GYMNASTICS. — Juniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

76. **II.** GYMNASTICS. — Seniors. Dancing, Swedish games, etc.
3 laboratory hours. Credit, 1.
Mrs. HICKS.

The Graduate School.

The Graduate School.

Kenyon L. Butterfield, A.M., LL.D., President of the College.

Charles H. Fernald, Ph.D., Honorary Director of the Graduate School.

Charles E. Marshall, Ph.D., Director of the Graduate School and Professor of Microbiology.

Graduate Staff, 1918–19.

Associate Professor Beaumont, Professor Cance, Professor Chamberlain, Assistant Professor O. L. Clark, Professor Crampton, Professor Fernald, Professor Foord, Professor Graham, Assistant Professor Hecht, Assistant Professor Itano, Professor Lindsey, Professor McNutt, Professor Osmun, Professor Peters, Professor Phelan, Professor Sears, Professor Waugh, Director Marshall, President Butterfield; Mr. Watts, Secretary.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years; the degrees of master of agriculture and doctor of agriculture are now granted to meet strictly professional needs. The number of requests for each of these courses is apparently increasing. In recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station specialists in farm management, dairying, live-stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; and for numerous other positions requiring a great amount of scientific and professional knowledge, training and experience.

Organization.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. Besides, each student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

Admission.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate

work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature, Methods and Requirements of Graduate Work.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful readings, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work. [Suspended during continuance of the war.]

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary properly to equip the individual professionally.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for the degree of master of landscape architecture will be expected to conform to the established courses of the department, and to the

requirements of the department in the preparation of a thesis, as well as in actual experience outside the college.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval by the student's advisory committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

Theses.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on original study; and must be an actual contribution to knowledge.

The thesis in its final form, must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required examination. Three complete copies are required. One of the said copies is to be retained as an official copy by the said director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

Final Examinations.

For the degree of master of science, master of agriculture, or master of landscape architecture, final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degrees of doctor of philosophy and doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

Degrees conferred.

The degrees of master of science, master of agriculture and master of landscape architecture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half[1] to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence. In the case of a master of landscape architecture the student must follow the prescribed course of study.

[1] All time statements refer to minimum time.

2. The earning of not less than fifty credits in the chief or major subject, and of not less than twenty-five credits in the minor subject. Students pursuing the course in landscape architecture will devote all of their time to the established course, and meet the conditions of one year of experience outside the college.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary. The thesis may be waived for the degree of master of agriculture.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The earning of not less than one hundred credits in the chief or major subject, and of not less than twenty-five credits in each of two minor subjects.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science, master of agriculture, or master of landscape architecture is $10, and for the degree of doctor of philosophy or doctor of agriculture, $25.

Courses offered.

Courses available as major subjects for the degree of doctor of philosophy: —

Agricultural economics.
Botany.
Chemistry.
Entomology.
Horticulture.
Microbiology.
Rural sociology.

Courses available as major subjects for the degree of master of science: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.

Courses available as major subjects for the degree of master of agriculture: —

Agronomy. Animal husbandry. Poultry science.

The course in landscape architecture leads to the degree of master of landscape architecture.

Courses available as minor subjects for the degree of doctor of philosophy: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape architecture.
Microbiology.
Poultry science.
Rural sociology.
Zoölogy.

Courses available as minor subjects for the degree of master of science: —

Agricultural economics.
Agricultural education.
Agriculture.
Agronomy.
Animal husbandry.
Animal pathology.
Botany.
Chemistry.
Entomology.
Horticulture.
Landscape architecture.
Mathematics and physics.
Microbiology.
Poultry science.
Rural sociology.
Veterinary science.
Zoölogy.

General Outline of Courses for Advanced Degrees.

Agricultural Economics (Major Course). — 1. Graduate research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances the method includes facility in investigation, tabulation and interpretation of results.

2. Candidates for the doctorate, the master's degree, or candidates offering a minor in agricultural economics, will be required to pass an examination covering the undergraduate work now offered in agricultural economics, including Course 50, the elements of economics, Course 75, the agricultural market and Course 52, co-operation in agriculture; and in addition such definite research work as may be outlined by the department, to consist of original investigations in some particular divisions of the subject of agricultural economics. Courses 52, 75, 76 and 77 are for graduates and undergraduates. Special investigations may be made by electing seminars in agricultural economics.

3. Candidates for the doctor's degree will be required to write a thesis, and candidates for the master's degree a thesis or a report, covering results of a specific line of personal investigation in one or more fields of the subject. Each candidate will also be required to have a working knowledge of the general field of economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, agricultural credit, statistics of agriculture and prices, and markets and marketing.

Agricultural Education (Major Course). — Courses are available in agricultural education as major or minor subjects for the degree of master of science, or, as a minor subject, for the degree of doctor of philosophy. Study will be pursued along one or several of the following lines: —

1. Massachusetts school legislation.

2. Origin and growth of primary, secondary and higher education in Massachusetts.

3. The origin and growth of normal schools, industrial schools and agricultural schools.

4. Educational literature, fiction, periodicals and reports.

5. The physical and mental development of the individual.

6. School administration.

Agronomy (Master of Science). — This course is developed in two directions, depending on whether the candidate is preparing for investigational work or for teaching. In the former case more attention is paid to methods of investigation; in the latter, to interpretation of results. The student may specialize in either Part I. or Part II. of the following: —

I. Soil Fertility. — (*a*) The humus problem: Effect of different cropping systems on the humus content of the soil; cultivation, drainage and liming in their effect on soil humus; increase by green manure crops; use of animal manures as sources of humus; conservation of organic matter.

(*b*) The nitrogen question: Losses of nitrogen as occasioned by cropping systems, tillage methods and soil treatment; gain of nitrogen through legumes and other agencies; commercial nitrogen, physiological effect upon the plant, comparison of different forms both in regard to their ultimate as well as immediate effect, amount of application from the business standpoint.

(*c*) Mineral elements of plant food: As above for nitrogen.

(*d*) Lime: Causes of "soil acidity;" comparison of forms of lime; ultimate effect of lime on soil fertility; cost *versus* returns from use of lime.

(*e*) Crop adaptability.

II. Field Crops. — (*a*) Distribution, as governed by soil fertility; climatic influences; economic conditions.

(*b*) Kinds and varieties.

(*c*) Cultural methods.

(*d*) Breeding: A knowledge of the principles of breeding is presupposed. With this as a basis, a study of methods, practices and results, as applied to a given crop, must be made.

III. Thesis. — The thesis may be taken either in soil fertility or in crop production. In either case a problem for original investigation must be formulated by the candidate, the line of attack developed, the work carried through and results presented in acceptable form.

Literature. — It is required that the candidate familiarize himself with the available literature of the various topics studied.

Animal Husbandry (Master of Science). — Course A. Animal Breeding. — 1. Reading: Thorough survey of the scientific works dealing with plant and animal breeding and improvement.

2. Project: Each student must outline and pursue some Mendelian problem.

3. Thesis: This is to be a complete treatise of the problem which the student undertakes; it should be a valuable contribution to the present knowledge of the question of animal breeding.

Course B. Animal Nutrition. — This course is in outline similar to A. It is designed to cover the field of nutrition, feeding and management of live stock.

Seminar: Regular periods will be devoted to a discussion of the projects undertaken, together with criticisms of the available material on the question pursued.

Object. — To give the student a comprehensive knowledge of feeding, breeding and management of live stock. This may be divided into a major and a

minor, in order to give the student the opportunity of devoting a proportionate share of his time to the class of live stock in which he is particularly interested.

Reading. — The student is to make a very complete survey of experimental and periodical literature dealing with the various phases of the subject.

Practice. — Before the completion of the work for the degree, the student must have the equivalent of at least one year's continuous work on an approved live-stock farm.

Seminar: Regular periods to discuss progress of the work.

Animal Pathology (Minor Course only). — 1. Reviews in anatomy.

2. Reviews in organography and histology.

3. Special lectures and readings in general and special pathology.

4. Laboratory studies in general and special pathology.

5. Pathological technique.

6. Conferences.

Botany (Major Courses). — The equivalent of certain undergraduate courses, determined in the case of each student by the department, is prerequisite. Candidates for the degree of master of science are required to pass a final examination in writing. A final examination in writing before the department and an oral examination before the graduate staff must be passed by candidates for the degree of doctor of philosophy. Candidates for the latter degree are required to attend all graduate lectures given by the department. Candidates for the degree of master of science will take those lectures given during their period of study in the department. All lecture courses will be given in rotation, except Courses 1 and 2, which will come every year. There will be three lectures a week throughout the fall, winter and spring terms. These lecture courses, outlined below, are designed to cover a period of three years.

1. Plant Physiology. — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants: growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements: the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks.

2. Plant Pathology. — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks.

3. Normal and Pathogenic Metabolism. — The lectures in this subject embrace, in more or less detail, comparative consideration of the metabolism of the host in health and disease; the metabolism of the parasite under varying conditions; enzyme activities in host and parasite; methods of preparation and determination of enzyme activities; chemical and physical changes induced in plant tissue by parasites; immunity, etc. Current investigations and new phases of the subjects under discussion will also receive attention as they appear. One hour a week for 24 weeks.

4. Plant Evolution. — Consideration of plant life in its inception; differentiation; origin and evolution of sexual and asexual reproduction; variation;

heredity and adaptation; phylogenetic relationships. One lecture a week for 24 weeks.

5. Biologic Relations. — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments will be made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks.

6. The Ecology of Plants. — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these factors; the various types of plant formation; the migration of plants; the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks.

7. Physiological Plant Pathology. — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks.

8. History of Botany. — A historical survey of the science; lives of noted botanists; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization; reading. One lecture a week for 18 weeks.

Seminar: A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important current botanical papers are discussed. Attendance and participation are required.

Collateral Reading: Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course.

Thesis: Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture.

Minor Course. — For a minor a student may take such of the work offered by the department as seems best suited to his major course. In most cases no problem will be assigned.

Professor Osmun, Dr. Chapman, Associate Professor Anderson, and Assistant Professor Clark.

Chemistry. — I. Major courses for the degree of master of science. Students will be required to take Courses 101, 108 to 114. In addition to this the requirements in the various thesis subjects are: —

Organic and Bio-Chemistry. — Courses 115 and either 105, 106 or 107, and 6 hours for one term selected from Courses 103 (*b*) and (*f*), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 116, 103 (6 hours), and 6 hours for one term selected from Courses 102, 104 to 107.

Physical Chemistry. — Courses 104, 117, and 6 hours for one term selected from Courses 102, 103, 105 to 107.

Agricultural Chemistry. — Courses 103 (6 hours), 118, and 6 hours for one term selected from Courses 102, 104 to 107.

The candidate must pass a final written and oral examination before the Department of Chemistry upon undergraduate Courses 1 to 80, inclusive, and upon all graduate work taken in chemistry by him.

II. Major course for the degree of doctor of philosophy. Students will be required to take Courses 101 to 114, and one course selected from 115 to 118. In addition, the student may be required to spend at least two terms or one semester at some other recognized institution pursuing graduate work in chemistry. The candidate must pass a final written examination before the Department of Chemistry, and an oral examination before the graduate staff, upon the whole field of chemistry, and must be especially well prepared in the lines of work covered by his research.

III. Minor course for the degrees of master of science and doctor of philosophy. Students will be required to take work totaling at least 25 credits. This may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared. In addition, the candidate must pass a final written and oral examination before the Department of Chemistry upon the courses taken and upon undergraduate Courses 27 and 51 to 80.

The following is a list of the courses: —

101. Inorganic Preparations. — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term, 6 hours.

102. Advanced Inorganic Preparations. — Laboratory. Continuation of Course 101. Any term, 6 hours.

103. Advanced Analytical Chemistry. — Laboratory. This course may be taken in part as follows: (*a*) electrolytic analysis, 6 hours; (*b*) ultimate analysis, 6 hours; (*c*) special analytical work to meet the needs of the individual student, 6 hours. In addition, parts of undergraduate Courses 61, 62, 76 and 77 may be taken, as follows: (*d*) fertilizers, 6 hours; (*e*) insecticides, 6 hours; (*f*) milk and butter, 6 hours. (*a*), (*b*), (*c*) may be taken any time; (*d*), (*e*), (*f*) must be taken at the time the undergraduate course is given.

Professor Wellington and Professor Peters.

104. Advanced Physical Chemistry. — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent. hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potas-

sium nitrate; adsorption of iodine by charcoal; splitting of racemic glycerinic or racemic tartaric acids into their optical components. To each student separate work will be assigned. Any term, 6 hours.

105. Advanced Organic Preparations. — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain and Thorpe, Gatterman, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term, 6 hours. Professor Chamberlain.

106. Advanced Bio-Chemistry. — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term, 6 hours. Professor Chamberlain.

107. Industrial Organic Chemistry. — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers and Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term, 6 hours. Professor Chamberlain.

108. Theoretical Chemistry. — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term, 1 hour. Given in 1917–18. Alternates with Course 109. Professor Peters.

109. Analytical Chemistry. — A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's Quantitative Analysis is used as a text. First term, 1 hour. Given in 1916–17. Alternates with Course 108. Professor Peters.

110. Organic Chemistry. — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions; isomerism, tautomerism, condensation, etc. References, Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term, 1 hour. Given in 1916–17. Alternates with Course 111. Professor Chamberlain.

111. Bio-Chemistry. — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes, fermentation, animal food and nutrition, photosynthesis. References, Monographs on Bio-Chemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term, 1 hour. Given in 1917–18. Alternates with Course 110. Professor Chamberlain.

112. Theoretical and Physical Chemistry. — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term, 1 hour. Given in 1917–18. Alternates with Course 113.

113. Theoretical and Physical Chemistry. — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term, 1 hour. Given in 1916–17. Alternates with 112.

114. Seminar. — Conferences, reports or lectures. Three terms, twice a month, 1½ hours. Professor Lindsey.

115. Research in Organic and Bio-Chemistry. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor Chamberlain.

116. Research in Analytical or Agricultural Industrial Chemistry. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by the amount of work done.
Professor Wellington and Professor Peters.

117. Research in Physical Chemistry. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done.

118. Research in Agricultural Chemistry. — Three terms. A minimum of 20 hours' laboratory work per week. Credit determined by amount of work done. Professor Lindsey and Experiment Station Associates.

Entomology (Major Courses, Ph.D. Degree). — 1. Morphology. — Lectures on all, and laboratory work on a portion of the following subjects: embryology and polyembryony; transformations; external morphology; histology; phylogeny; hermaphroditism; hybrids; parthenogenesis; pedogenesis; heterogeny; chemistry of colors; coloration; luminosity; deformities; variation.

2. Ecology. — Lectures and laboratory work as above on the following subjects: dimorphism; polymorphism; protective devices; mimicry; insect architecture; plant fertilization; insect products; geographical distribution; methods of distribution; migration; geological history; insects and disease; enemies of insects, vegetable and animal; duration of life; experimental entomology and insect behavior.

3. Economic. — Lectures and laboratory work as above on the following subjects: special methods of control; insecticides; special research; insect photography; methods of preparing illustrations; field work and life-history investigations; insect legislation; methods of record keeping.

4. Systematic. — Lectures and laboratory work as above on the following subjects: history of entomology; classifications and principles of classification; nomenclature and its rules; how to find and use literature; preparing

indices; number of insects known and in existence; lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections; location of types.

5. Seminar. Required readings; thesis.

All of these five courses are required of students taking a Ph.D. in entomology.

Minor Courses. — Such portions of the major courses as are most closely correlated with the other lines of work taken by the student and which can be completed in the time available.

Professor Fernald, Professor Crampton and Associate Professor Regan.

Horticulture. — Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which now constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Prof. F. A. Waugh, head of the Division of Horticulture.

Landscape Architecture (Major Course). — Every student before receiving his master's degree in landscape gardening must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. Theory. — The principles of esthetics as applied to landscape gardening.

2. Design. — The principles of pure design and their application in landscape and garden planning.

3. Construction. — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. Maintenance. — Methods, organization, cost.

5. Practice. — Office work, drafting, estimating, reporting, charges, accounting.

Qualifications. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college, and also one year must be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Thesis or Project. — Each student before receiving the master's degree with a major in landscape gardening must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

(*a*) Original surveys, including topography.
(*b*) Block plans, showing original design.
(*c*) A rendered plan or plans of the main features.
(*d*) Detailed working drawings.
(*e*) Estimates of cost.
(*f*) Complete report and letter of transmittal.

Minor Course. — Any student electing a minor in landscape gardening will be directed to take such courses from the regular catalogue list as may seem most suitable for him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Prerequisite Work. — The undergraduate courses in the college known as Landscape Gardening 50, 51, 52 and 53, Drawing 25, 26, 27, Horticulture 27, 50, 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student not having passed these courses or their equivalent will be required to make up such work without graduate credit. Courses known as Landscape Gardening 75, 76, 77, 78 and 79 are required and may or may not be accepted for graduate credit, at the discretion of the department.

Microbiology. — I. Courses leading to the Degree of Doctor of Philosophy. — 1. The candidate must present twenty-five credits from the undergraduate study as furnished in undergraduate Courses 50, 51, 52, 80, 81 or an equivalent before he can enter upon graduate study.

Note. — Twenty-five credits are required of undergraduates majoring in microbiology.

2. The candidate must pursue successfully the following special courses or their equivalent. These courses are designed to give a comprehensive survey of the fields indicated, and are arranged especially for graduate students.

175. Agricultural microbiology,	5 credits.
176. Agricultural microbiology,	5 credits.
182. Dairy microbiology,	5 credits.
183. Food microbiology,	5 credits.

Note. — Courses 175, 176, 180, 181, 182, 183 correspond in subject-matter with Courses 75, 76, 80, 81, 82, 83 of undergraduate study; the latter courses are elementary in nature, while the former are arranged for intensive advanced study of graduate character. Candidates will be required not only to perform the exercises of the above courses, but will be expected to assist in teaching the elementary classes covering the same theme as a part of graduate requirements.

3. It will be necessary to complete additionally the following courses or their equivalent, open only to graduate students: —

190. I. 1917. Studies in technique, as photomicrography, laboratory equipment and manipulation.[1]
5 to 10 credits. Assistant Professor Itano.
151. II. 1918. Cytological and morphological studies and technique.[1]
5 to 10 credits. Professor Marshall and Mr. Hood.
152. III. 1919. Physiological studies.[1]
5 to 10 credits. Assistant Professor Itano.
177. II. 1919. Microbial studies in agriculture. Specific subjects.[1]
5 to 10 credits. Professor Marshall, Assistant Professor Itano and Mr. Hood.
181. II. 1920. Advanced sanitary or hygienic studies.[1]
5 to 10 credits. Professor Marshall and Assistant Professor Itano.
150. I., II., III. Lectures and study of literature.[2]
10 credits. Professor Marshall, Assistant Professor Itano and Mr. Hood.
200. I., II., III. Research.[3] (Some microbiological problem related to agriculture.)
40 to 50 credits. Professor Marshall, Assistant Professor Itano and Mr. Hood.

The thesis prepared must be satisfactory to the department and the graduate staff, and the candidate must be ready to defend it at his public examination. Further, following the presentation of the thesis, the candidate must submit to a written examination covering the entire subject by the department and a public oral examination under the auspices of the graduate staff.

II. Courses leading to the Degree of Master of Science. — 1. Prerequisite studies, as in the case of the degree of doctor of philosophy (I., 1)

2. Special studies as represented by courses —

175. Agricultural microbiology, ... 5 or 10 credits.
176. Agricultural microbiology, ... 5 or 10 credits.
182. Dairy microbiology, ... 5 or 10 credits.
183. Food microbiology, ... 5 or 10 credits.

3. Courses designed for graduate students only.

150. I., II., III. Lectures and study of literature.
5 credits. Professor Marshall, Assistant Professor Itano and Mr. Hood.
200. I., II., III. Research.[3] (Some microbiological problem related to agriculture.)
15 to 25 credits. Professor Marshall, Assistant Professor Itano and Mr. Hood.

The thesis submitted must be satisfactory to the department and to the graduate staff.

The candidate will be required to take a written examination and an oral examination by the department.

III. Minor Work in Microbiology. — May consist of Undergraduate Courses 50, 51, 52, and one other course, designed to support his major work, from among Courses 175, 180, 181, 182, 183. He will also be required to pursue Graduate Course 150 through four terms (see II., 3, 150). In case the candidate has had some of these courses he will be required to take more advanced substitute courses. A written examination over the subject-matter covered will be given at the close of the work.

Poultry Science (Major Course for the Degrees of M.S. and M.Agr.). —

1. Reading. — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

---

[1] Repeated every three years.
[2] Continues over three years, once each week.
[3] Distributed as may be most beneficial for research work. Time and credit by arrangement.

2. Seminar. — A critical review and a criticism of the more important experiments carried on at the various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

3. Anatomy (Gross and Histological), Physiology and Surgery. — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

4. Breeding. — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

5. Feeding. — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

6. Brooding. — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

7. Incubation and Embryology. — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

8. Poultry Diseases and Sanitation. — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

9. Thesis. — A thesis based on first-hand work on some problem in poultry biology or husbandry is required of all students working for the M.S. degree, and may be required of those working for the M.Agr. degree.

Note 1. — The postgraduate course presupposes all undergraduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 5, 6 and 7. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

Note 2. — Practical poultry work may be required, but no credit will be given for such work.

Note 3. — Courses 1 and 2 are designed particularly for minors.

Rural Sociology. — Courses are offered in Rural Sociology as major or minor subjects for the degree of doctor of philosophy.

Candidates for the master's degree will be required to pass an examination in all courses offered by this department primarily for undergraduates, as shown in the departmental classification. In addition they will be required to select one or more of the divisions of the subject for intensive study and research, as indicated below.

A thesis showing the results of personal investigation on some particular topic or topics must be presented. The thesis must show familiarity with the

material bearing on the subject, ability in discovering and utilizing original sources, judgment in evaluating facts, evidences and authorities, originality and independence of thought. It must be a contribution in a very definite way to rural sociological thought.

Topics for Study and Research.

1. The rural community: —
   (*a*) Historical development.
   (*b*) Influence of modern conditions on family and community life.
   (*c*) Problems and methods in community organization.
   (*d*) Community planning in Massachusetts.
2. Origin and development of rural institutions: —
   (*a*) Scope, function and influence of educational institutions on rural social progress. Plans for betterment.
   (*b*) History of the development of the rural church, its problems and program for improvement.
   (*c*) The farm family, in its relation to religious, cultural, educational and social agencies. The relation of the standard of living to rural social progress.
3. Rural organization: —
   (*a*) The scope and function of rural organization in development of rural life.
   (*b*) Work of the national government in rural organization.
   (*c*) County and institutional work in rural organization.
   (*d*) Leadership in its relation to organization.
4. Rural government and rural law: —
   (*a*) Development of rural local government in New England and the west. Progress in efficient local self-government.
   (*b*) Relation of the State to the farmer, influence of the farmer in legislation, the organized ways and means by which the State aids the farmer directly.
   (*c*) Work of the national government in its relation to the social welfare of the farming people.
   (*d*) Agrarian legislation in the United States and Europe affecting rural social welfare.
5. Farmers' organizations: —
   (*a*) Social problems underlying farmers' organizations in reference to service and permanency.
   (*b*) Principles of organization.
   (*c*) History of farmers' organizations in the United States.
6. Rural social and sociological surveys: —
   (*a*) An intensive study of the place and function of statistical data in the sociological field, its evaluation and interpretation.
   (*b*) A critical study of social surveys of rural life and methods of survey, with a view to discovering the strength and weakness of each.
7. Social condition of the rural people: —
   (*a*) Origin and development of rural ideals.
   (*b*) The status of the rural people in relation to health, morality, crime, etc.
   (*c*) Problems of social psychology arising in rural life.

The course required for candidates offering a minor will be arranged after a conference with the director of the department, and will take into consideration the needs of the student in view of his previous preparation. The amount of time required of the student for his minor work will correspond with the requirements of the graduate school.

Veterinary Science. — Work is available in anatomy, hygiene, veterinary pathology, medicine, surgery, parasitology and other special lines or divisions of the subject.

Zoölogy. — Courses in zoölogy may be available as a minor for the degree of master of science and as a minor for the degree of doctor of philosophy. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field and correlated closely with the major work of the

student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science. The time devoted to zoölogy as a minor for either of the above-named degrees may vary from 12 to 16 hours per week, pursued for a year and a half.

List of Students.

A list of the degrees conferred in the Graduate School, and of the students enrolled, is given in the general lists at the end of the volume.

THE SHORT COURSES.

The Short Courses.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those, both young and old, who cannot come to the college for the regular agricultural courses. They furnish the student with instruction in modern accepted methods and are planned to help the farmer and the housewife.

The short courses include: —

A. The Two-year Course in Practical Agriculture.
B. The Ten Weeks' Winter School.
C. The Summer Schools.
D. The Vocational Poultry Course.
E. Courses lasting more than a week for special groups (a six weeks' course in agriculture was offered in 1919 for returned soldiers and sailors).

Requirements for Admission to Short Courses: — Students must be at least seventeen years of age and must furnish satisfactory evidence of good moral character. References are required. There are no entrance examinations. The sole test is ability to do the prescribed work. Students enrolling for the Two-year Course in Practical Agriculture must have at least a common school education.

Expenses of Short Courses. — The expense of attending any of the short courses is approximately as follows: —

Furnished rooms in private houses (per week),	$2 to $4
Board at college dining hall (per week),	$6
Board with private families (per week),	$6.50 to $8
Registration fee (Ten Weeks' Winter School and Summer School),	$5

Tuition in all the short courses is free to residents of the Commonwealth. Small laboratory fees are charged in the Two-year Course in Practical Agriculture.

A. Two-year Course in Practical Agriculture.

The Two-year Course in Practical Agriculture is offered to meet the needs of students who for one reason or another cannot take the four-year college course. It is designed to provide the largest amount of practical information and training in agriculture and horticulture in the shortest possible time consistent with thoroughgoing work. This course is open to men and women seventeen years of age or over who have at least a common school education. The Two-year Course in Practical Agriculture was organized in 1918, the first term beginning December 2 and continuing for a period of four months. Owing to the fact that young men of eighteen were subject to military service, students of sixteen years of age were admitted during this year. It was deemed inadvisable while war conditions prevailed to offer more than a four months' term in order that students might return to the farm in time for the spring work. All subjects offered during this four months' term were made

elective. Beginning with the fall of 1919 the course will be organized on the year basis. Six months of farm experience will be required. Students interested in this course should send for the special bulletin describing the work.

CERTIFICATE. — All students will receive a certificate showing their standings in courses in which they were registered. Credits earned in the Two-year Course in Practical Agriculture or in any other of the short courses do not lead to the college degree. Students who possess college entrance requirements and who wish to take the regular college work should address the registrar of the college.

SCHOLARSHIPS. — In connection with the Two-year Course in Practical Agriculture the New England branch of the Woman's National Farm and Garden Association offered five scholarships of $100 each, available to women electing agricultural courses.

OUTLINE OF THE WORK OFFERED IN FIRST TERM OF THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE, DEC. 2, 1918, TO MARCH 22, 1919.

Crop Production. Professor BEAUMONT. Five class periods per week.
Breeds of Live Stock and Live Stock Judging. Mr. HOLDEN. Two class periods and one two-hour laboratory period per week.
Live Stock Feeding and Management. Professor MCNUTT. Three class periods per week.
Business Principles of Farming and Marketing of Farm Products. Dr. CANCE. Five class periods per week.
Dairying. Professor JAMISON and Mr. DRAIN. Three class periods and two laboratory periods per week.
Fruit Growing. Professor SEARS. Five class periods per week.
Market Gardening. Professor DACY. Three class periods and two laboratory periods per week.
Insect Pests and their Control. Professor FERNALD. Five class periods per week.
Diseases of Crops. Professor OSMUN. Five class periods per week.
Poultry Husbandry. Professor GRAHAM. Two class periods and three two-hour laboratory periods per week.
Farm Machinery. Professor GUNNESS. Two class periods and three two-hour laboratory periods per week..

B. THE WINTER SCHOOL.

The Winter School, beginning usually about January 1 and continuing for ten weeks, is planned to meet the needs of the more mature practical farmers and farm women who wish to secure in a short period of time instruction that will help them with their individual problems on the farm. There is a wide range in the choice of subjects, making it possible for the student to take work for several winters in succession. Many college graduates enroll for the Winter School.

SCHOLARSHIPS. — The Jewish Agricultural and Industrial Aid Society of New York has instituted a system of free scholarships to enable the children of Jewish farmers to attend the short winter course in the States in which they reside. The stipend is sufficient to pay all the expenses of the holder for the course; such expenses usually amount to from $100 to $150. The following courses are offered: —

OUTLINE OF THE TEN WEEKS' WINTER SCHOOL, DECEMBER 30 TO MARCH 8.

Soil Fertility. Professor BEAUMONT. Three class periods per week.
Field Crops. Professor COOPER. Two class periods and one laboratory period per week.
Types and Breeds of Live Stock. Professor MCNUTT. Three class periods and two laboratory periods per week.
Dairying. Professor JAMISON and Mr. DRAIN. Five class periods and five laboratory periods per week.

Animal Diseases and Stable Sanitation. Professor Paige. Two class periods per week.
Poultry Husbandry. Professor Graham and Professor Payne. Five class periods and one laboratory period per week.
Dairy Bacteriology. Professor Marshall. Two class periods and one laboratory period per week.
Fruit Growing. Professor Sears. Three class periods and one laboratory period per week.
Market Gardening. Professor Dacy. Three class periods and two laboratory periods per week.
Floriculture. Mr. Whiting. Five class periods per week.
Horticultural Manufactures. Professor Chenoweth. Two class periods and two laboratory periods per week.
Farm Management. Professor Foord and Mr. Peacock. Two class periods per week.
Farm Accounts. Mr. Peacock. Two two-hour laboratory periods per week.
Marketing. Miss Jefferson. Two class periods per week.
Agricultural Credit. Miss Jefferson. Two class periods per week.
Botany. Professor Anderson. Two class periods per week.
Entomology. Professor Regan. Three class periods per week.
Farm Mechanics. Professor Gunness. One class period and two laboratory periods per week.
Rural Sanitary Science and Hygiene. Professor Marshall. Two class periods per week.
Foods and Conservation. Miss Skinner. Three class periods and two laboratory periods per week.

C. The Summer School of 1919.

The summer school of agriculture and country life will open July 1, 1919, for a term of four weeks. This will be the twelfth session of the Summer School. Those in the past have been highly successful.

The Summer School of 1919 will afford opportunity for those who wish a general knowledge of theoretical and practical agriculture who can come to college conveniently during the summer season. More work in agriculture, horticulture and related subjects will be offered in 1919 than in previous years. Special attention will be given also to the needs of teachers. A course of evening lectures on popular topics related to the work of the school is a feature of the general program.

The expenses are low. Amherst is situated in one of the most noted and historical centers of the country. Any one interested in problems pertaining to country life will find an opportunity for study in the 1919 Summer School. A descriptive bulletin may be had about April 1.

D. One-Year Vocational Course in Poultry Husbandry.

Purpose. — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping and can spend only one year at college.

Scope. — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, bee culture, animal husbandry or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from twenty-five to thirty hours per week at the plant in the care and management of poultry for the purpose of becoming proficient in the various branches of the work.

Entrance Requirements. — Applicants must be at least eighteen years of age and have a good elementary education.

Fees. — There is no tuition for residents of Massachusetts, but a laboratory fee of $5 is required for both the fall and spring terms.

Note. — The course is limited to 16 students.

E. Six Weeks' Course in Agriculture, Soldiers and Sailors, Feb. 10 to March 22, 1919.

This course was planned for men discharged from military service who desired agricultural instruction. The following subjects were offered: —

Soils and Fertilizers. Professor Beaumont. Three class periods per week.
Field Crops. Professor Cooper. Two class periods and one laboratory period per week.
Types and Breeds. Mr. Holden. Three class periods and two laboratory periods per week.
Poultry. Professor Payne. Four class periods and one laboratory period per week.
Fruit. Professor Sears and Mr. Drain. Three class periods and one laboratory period per week.
Farm Machinery. Professor Gunness and Mr. Pushee. One class period and two laboratory periods per week.
Dairying. Mr. Whittemore. Three class periods and two laboratory periods each week.

All requests for announcements or further information regarding any of the short courses should be addressed to John Phelan, Director of Short Courses, Amherst, Mass.

THE EXTENSION SERVICE.

The Extension Service.

The Extension Service of the Massachusetts Agricultural College is an organized effort to carry systematic and dignified instruction to the thousands of people throughout the State who are unable, owing to various reasons, to take advantage of the regular courses offered at the college. It is in reality the "carrying of the college to the people of the State." Every department of the institution, in so far as the regular teaching and research work will permit, contributes what it can to this work. There is also a regular staff of extension workers whose business it is to present the instruction of the college to individuals and various educational organizations such as extension schools, granges, Y. M. C. A.'s, churches, boards of trade, etc., throughout the State. Because of the peculiar conditions which are presented to all agricultural workers this year the rôle played by the Extension Service assumes greater proportions than ever before. A large amount of effort is given on the part of the extension workers to the war emergency work in food production and the economy of the home. Extension work may be roughly classified under the following general heads: general administration; correspondence studies; itinerant instruction, which includes lectures and lecture courses, exhibits, demonstrations and extension schools; extension work through the various departments of the college, in which the extension specialist is responsible to the head of the department for the technique of the work and to the director of the Extension Service for its accomplishment; co-operative work of various kinds with the United States Department of Agriculture; and extension work through county, district and local agents. Some of the ways in which this is being done are briefly described below.

Courses given at the College.

1. Farmers' Week. — This week has become a very prominent feature of the agriculture of the State. Instruction is presented by means of lectures, demonstrations, exhibits, round tables and conferences, covering a period of five days. The regular college equipment is used, and the work of the college faculty is supplemented by lectures and demonstrations by eminent men and women from our own and other States. The 1919 program will be divided into 3 sections, as follows: —

1. Agriculture.
2. Horticulture.
3. Home Economics.

These sections take up the time from early morning until late afternoon, and in the evening there are lectures given by prominent men and women. Fruit, corn, live stock, dairy and poultry shows and other exhibits present the most recent improvements in these various lines of work that should be brought to the attention of the farmer who hopes to keep his work and equipment modern. No fee is charged.

2. Annual Beekeepers' Convention. — This convention is held during Farmer's Week. Illustrated lectures, practical demonstrations and commercial displays are important features of the convention. Meetings of State and county beekeepers' associations and of apiary inspectors also are scheduled at this time.

3. Polish Farmers' Day. — A special day is set aside in March of each year which is known as Polish Farmers' Day. There are hundreds of Polish farmers in the Connecticut valley, and this day represents a special effort on the part of the college to be of service to them. Instruction is given relative to the crops and animals in which these people are most interested, soil fertility problems, co-operation, American citizenship, Polish and American history, etc. The services of an interpreter make the day's exercises of added interest and value.

4. Annual Conference of County Agents and Vocational Agricultural Instructors. — In December of each year a one-week conference of county agents and vocational agricultural instructors is held at the college. This is for the purpose of correlating the extension work throughout the State, and to enable the field workers to keep in up-to-the-minute touch with agricultural problems, methods and research as conducted in Massachusetts as well as other States in this particular section of the country. The next annual conference will probably be held during the third full week in December, 1919.

5. Poultry Convention. — In the preparation of our sixth annual poultry convention the wishes and needs of the poultrymen and women of the State will be the first and only consideration. It is not often that the poultry public has an opportunity to hear men of national reputation from different parts of the country, and it is such men that we secure for this occasion.

The special features of the program for 1919 will be as follows: —

1. Lectures by the best talent that can be secured.

2. Demonstrations in killing, picking, packing and preparation for retail trade.

3. Demonstrations in grading and judging market eggs.

4. Demonstrations in selection and mating both for utility and exhibition purposes.

5. Demonstrations with poultry equipment.

6. Poultry museum. Samples of feeds, equipment, diseased specimens, charts, etc.

7. A small poultry farm in Massachusetts. This will be made one of the special features of the program.

Program ready June 1.

6. Agricultural Camp. — During July, dates to be announced. These camps are arranged in order that boys from rural districts and small towns may receive some instruction in agriculture and clean, wholesome sports, and that they may have impressed upon them their responsibilities as coming members of society. Teachers, clergymen, Y. M. C. A. workers and county agents are especially urged to send boys who will be benefited by the instruction given at these camps.

The main purpose of these camps is fourfold: —

1. To interest the boy in agriculture and country life. This is the primary object.

2. To impress on the boy his responsibilities as a member of society.

3. To teach the boy clean, wholesome sports, recreation and proper spirit in competitive contests.

4. To demonstrate the value of a boys' camp as an educational factor.

The camps are under military discipline. Not more than forty-two boys — reservation being made for three from each county — will be taken at one time, therefore application should be made early. A succession of these camps, each lasting one week, will be arranged during July. The College feels it has a direct duty to the boys of the State whose inclinations draw them toward agricultural pursuits. In addition to instruction along agricultural lines there will be a well-balanced program of instruction in some of the vital problems of life, and periods will be devoted to athletics and other forms of recreation. The cost to each boy has, in the past, been $8 for the week. This fee helps defray the cost of maintaining the camp, meals, instruction, lectures and so forth.

The daily program consists of camp duty, flag raising, agricultural lessons, talks on hygiene and good citizenship, play and recreation, instruction in handicrafts and photography, evening camp fires, and lectures by men prominent in boys' work. The regular instructors of the college give practical talks on various agricultural specialties, these talks being followed by demonstrations and by inspection of the departmental equipment, such as the dairy, poultry plant, orchards, etc.

Features of the agricultural work are the stock-judging contests, corn-judging contests, operation of the Babcock milk test and similar specialties. The talks by the different instructors are made very practical, and the boys are given every opportunity to participate in the various lines of agriculture which are outlined.

During the past three years the third camp has been composed of the third prize winners in the State-wide boys' and girls' clubs, a separate camp being maintained upon the same general plan for the girl winners. This will undoubtedly be a feature of these camps in the future.

Opportunities are given for those interested to receive instruction under special teachers in basketry, photography, stock-judging, whittling, surveying and map reading, wireless telegraphy, wig-wagging, shop work, first aid, rope tying and splicing, seed testing, military drill, bird study, etc. Other features are the camp newspaper, minstrels and vaudeville, debates and mock trial and the camp circus.

7. Conference on Rural Organization. — This conference is held as a closing feature of the summer school each year. It takes up various problems of New England country life. Numerous State organizations co-operate with the college in providing the programs. Section meetings of various groups are held each forenoon, a general round-table discussion is held each afternoon, and lectures are delivered each evening by persons prominent in social and educational work. Many small group conferences are also arranged. This conference will follow immediately after the summer school.

Home Study Courses. — The purpose of the home study courses is to furnish systematic instruction in those lines which will most benefit the general farmer, the dairyman, the fruit grower, the market gardener, the poultryman, the teacher, the homemaker, and all others who are interested in agricultural and country-life matters. It is the purpose to present up-to-date, accurate and concise information in such a manner and in such language that all who pursue the study may readily understand the work.

Courses offered. — A number of courses are in process of revision and several are being rewritten. During 1919 courses will be available as follows: —

1. Soils and Soil Fertility. Assistant Professor Jones.
2. Manures, Fertilizers and Soil Amendments. Assistant Professor Jones.
3. Field Crops. Assistant Professor Jones.
4. Farm Dairying. Professor Lockwood.
5. Fruit Growing. Professor Sears, Associate Professor Chenoweth.
6. Vegetable Gardening: Part I., Market Gardening, Part II., Home Gardening. Professors H. F. Tompson and H. R. Francis.
7. Animal Feeding. Professor B. E. Pontius.
9. Farm Accounts. Professor Foord.
10. Entomology. Dr. Regan.
12. Beekeeping. Associate Professor Gates.
13. Forestry. Professor Clark.
14. Shade Tree Management. Professor Osmun.
15. Plant Diseases. Mr. Doran.
17. Poultry Husbandry. Professor Graham.
18. Home Economics. Extension Professor Comstock.

Methods of Conducting the Work. — The best known methods of conducting correspondence course teaching are employed. Certain courses are based entirely upon text-books, others consist wholly of typewritten lectures, while others combine the two. If books are not required they are usually recommended.

The courses are designed primarily for the individual student. A new phase of the work, however, is the organization of study clubs or classes, meeting together periodically and using the courses as a basis of study. Correspondence in regard to this work is invited.

Enrollment of Home Study Courses. — Students may enroll in the courses at any time between October 1 and June 1, and one year from the date of registration is allowed for the completion of each course.

Expenses of the Courses. — In order that none shall enroll except those who are interested and desire to pursue earnest study, a small fee is charged. This has been fixed at $2 for each course except where the courses are divided, and it has been found advisable to charge $2 for each of the parts in these instances. The fee is payable strictly in advance, at the time the enrollment card is sent. When text-books are required the student purchases these.

Lectures and Demonstrations. — The members of the faculty of the college are, when other duties will permit, available for lectures and demonstrations before granges, men's clubs, women's clubs, Y. M. C. A.'s, farmers' clubs, boards of trade and other organizations. A list of more than 40 lecturers and 200 subjects on various phases of agriculture, country life, economics, sociology, education, civic betterment and various scientific subjects has been prepared. Full courses of lectures or single lectures may be arranged.

Organizations arranging the lectures are asked to pay the traveling expenses of the lecturer, provided no admission fee is charged. When admission is charged the lecturer is entitled to a fee in addition to traveling expenses.

Extension Schools. — The extension schools are of two distinct types, the first being the Agricultural Extension School, dealing with the production side of farming and with the problems of the farm home; the second is the Extension School in Community Planning, having to do with the organization and selling end of agriculture, and with instruction in the planning and carrying forward of various community activities.

It is also possible to arrange special extension schools along one particular line of work, such as fruit growing, dairying, etc.

Communities desiring an extension school make a written request, agreeing to defray all local expenses, such as the rent, heating and lighting of a suitable hall, and the board of the instructors during the school.

Agricultural Extension Schools. — The college sends a corps of instructors to a town for a five-day school of instruction. At present the following courses are offered: soil fertility, animal husbandry and dairying, fruit growing, poultry husbandry and vegetable gardening for the men, and a homemakers' course for the women. Morning and afternoon sessions only are held.

Community Planning Extension Schools. — These schools are arranged to extend over at least three days. The following courses are offered: education, agricultural organization, community program, civic improvement, farm management, town administration, public health, community recreation and homemaking. Morning, afternoon and evening sessions are held in these schools.

Educational Exhibits at Fairs and Other Shows. — The college co-operates with the managers of fairs, industrial expositions, corn shows, poultry shows, fruit shows and other exhibitions by making educational exhibits.

For outside work a large tent has been provided. In this about thirty cabinets containing educational material are arranged. A corps of lecturers and demonstrators accompany the exhibit and give practical instruction daily.

For inside work a space at least 40 by 60 feet is required for this exhibit. Smaller exhibits along special lines are sent to corn, fruit and poultry shows, milk shows, child welfare exhibits, and so forth.

The managers of fairs and exhibits are required to partially meet the cost of presenting these exhibits.

Extension Work in Special Fields.

Extension Work in Fruit Growing. — This work includes lectures and demonstrations on laying out and planting orchards, pruning, spraying, thinning, grading, packing and marketing fruits. Demonstration orchards, new and renovation plots, are established in different sections of the State, under a co-operative agreement between the college and the owners of land. Extension schools in fruit growing and fruit grading and packing are arranged on request. Visits to farms for advisory work are made, and correspondence on orcharding subjects is invited.

Extension Work in Animal Husbandry. — This work includes lectures, demonstrations and advisory assistance on subjects pertaining to cattle, horses, sheep and swine, as well as instruction in barn planning. Assistance in organizing dairy improvement associations and breeders' associations is given; stock-judging contests for boys are arranged at the leading fairs.

Extension Work in Dairying. — This includes lectures and demonstrations on the handling and care of milk, cream, butter and cheese; Babcock testing, dairy utensils and dairying manufactures. Educational campaigns may be arranged in different communities, seeking to educate producers, dealers and consumers as to the production and distribution of clean, safe milk.

Extension Work in Poultry Husbandry. — In addition to conferences at the college and visits to the plants of poultrymen, advice on general poultry

management, diseases, mating, and laying out and planning buildings, this work includes co-operative work with other State and county agricultural and educational organizations, exhibits of poultry appliances at fairs and shows and other incidental phases.

Extension Work in Sheep Husbandry. — Extension work in sheep husbandry has consisted of meeting farmers on their farms to advise them concerning more profitable methods of caring for their flocks; in visiting farmers not having sheep, but who were contemplating starting in the business; in the supervision of two demonstration flocks; and in extension schools, lectures before various organizations, and work on the fair circuit. Up to July 1 the specialist was employed part time with the State of Rhode Island.

Extension Work in Farm Management, Field Studies and Demonstrations. — This is carried on co-operatively between the college and the office of farm management of the United States Department of Agriculture at Washington. It consists of a study of farm conditions and farm management problems; instruction in keeping farm accounts and growing field crops; the use of fertilizer and lime; advice as to farm equipment, buildings, and so forth. Farm accounting is given special attention.

Extension Work in Home Economics and Food Conservation. — This work includes lectures and demonstrations on subjects pertaining to household economy, dietetics and the preservation of foods. Instruction is carried on by means of extension schools in rural and urban communities, and is designed both for the housewife and for leaders and supervisors.

Junior Extension Work. — This is an organized effort to promote in the public schools of the State the study of agriculture and practical arts relating to country life. This is accomplished by means of conferences with school officials and school patrons, the promotion of agricultural clubs among the school children, and lectures before granges, farmers' clubs and other interested organizations. The work of the agricultural clubs is under the direction of the superintendent of schools or some one recommended by him. Each town should hold an annual exhibit of products. Exhibits representing rather extensive districts are incorporated with the various agricultural fairs in the State. In this manner elementary instruction in agriculture is promoted by the combined efforts of the public schools, of the patrons of the schools through their agricultural fairs, and of the Agricultural College, which in turn co-operates with the State Board and the United States Department of Agriculture.

Local Community Organization. — A number of communities in the State have appealed to the college for aid in bringing the various organizations in the community to a higher state of efficiency, in order that they themselves might take definite steps toward community development and advancement. The college is now prepared to make scientific studies of communities which lead up, by means of surveys, to the organization of local committees to study the agricultural, educational, religious, transportation, recreation and civic needs of the communities. Several State organizations and some national organizations are usually brought in to aid in working out the plans presented by these committees. Conferences on community affairs are held upon request. The college acts merely in an advisory capacity, the communities themselves doing the actual organization work.

Library Extension Work. — This consists principally of loaning to public libraries of the State general collections of 10 to 30 books and bulletins on agriculture and related subjects. Special collections of smaller size on specified

subjects, such as fruit growing, dairying, poultry, beekeeping, home economics, and so forth, are also sent out. These may be kept from four to eight weeks, according to the demand for them. The only expense to local libraries is transportation charge on the books both ways. The college library also supplies, upon request, information regarding books on agriculture and related subjects.

Agricultural Surveys. — To acquire definite information as to existing conditions in rural communities, to be used as a basis for further extension work, agricultural surveys are made. The different organizations and officials in the community, such as the town officers, superintendent of schools and teachers, clergymen, librarians and others, usually co-operate in making such surveys. The survey covers all phases of community life, including soil survey, farm management practices, and the educational, social, religious and recreational life. The inventory is made upon carefully prepared blanks.

Business Co-operation and Marketing. — This work has for its object the establishment of agriculture on a better business basis. Assistance is given in organization of co-operative buying and selling associations, the securing of rural credit, the adoption of better methods of marketing, the establishment of a better market for agricultural produce, and other lines of agricultural co-operation.

Food Preservation. — On account of the demands for instruction in food preservation, particularly preservation of fruits and vegetables, much attention was given to this work during the year, the work being carried on chiefly through training local leaders how to handle the work. Work in the field was in co-operation with county extension workers. During the summer of 1918, 36 training schools were held, attended by 835 people. The food situation made it seem necessary to carry on two distinct lines of work relative to food preservation: (1) conservation of sugar, (2) the home manufacture of fruit products.

County or District Agricultural Agents. — The college is co-operating with farm bureaus and improvement leagues in all the counties of the State in carrying on extension work in agriculture and home economics. Residents of the county or district may, without cost, call upon the agent for assistance upon any agricultural subject. The work is being partly supported through the co-operation of the United States Department of Agriculture, the college and the county engaging the agent.

Advisory Work with Institutions and Individuals. — Special effort is made to comply with as many of the requests of State institutions and individuals who ask for advice on farm problems as possible. The force of instructors available for this work is at present insufficient to take care of all the demands. Special trips, including visits to a number of the various State institutions, are occasionally made by a group of specialists.

Publications of the Extension Service. — In addition to the regular circulars and bulletins which announce the various short courses and lines of work mentioned, publications giving timely information on agricultural subjects are issued. Large numbers of helpful circulars and bulletins are annually distributed. A series of bulletins especially for the farm woman is one feature of this work. Reports of the work of the Extension Service, dairy record blanks, farm account blanks, boys' and girls' club circulars, lists of books, and so forth, may be had upon request.

Co-operation with Other Organizations. — The aim of the Extension Service is to co-operate with existing organizations so far as possible. It is, therefore, glad to work with local organizations, and welcomes suggestions from

town officers, local granges, farmers' clubs, women's clubs, Y. M. C. A.'s, Y. W. C. A.'s, boards of trade, village improvement societies, teachers, clergymen, librarians and others interested in agriculture and country life, as to needs and methods best adapted to the meeting of these needs.

Information by Correspondence. — Besides the activities mentioned, hundreds are helped through personal visits to farms, and still larger numbers through letters of inquiry, which always receive the most careful attention from every department of the institution.

Pamphlets and bulletins are sent free to all who apply for them, and any who desire such help as has been mentioned should address the Director of the Extension Service, Massachusetts Agricultural College, Amherst, Mass.

General Information.

General Information.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

Tuition.[1] — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of $60 a year. The tuition charged persons not citizens of the United States is $120 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.

All students entering the college for the first time as undergraduates or unclassified students are charged a matriculation fee of $5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

Dormitories and Board. — The college has dormitory accommodations for about 62 students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $3 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is about $6 a week.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; other citizens of the United States, $60 a year; foreigners, $120 a year.

	Low.	High.
Matriculation fee, first year,	$5 00	$5 00
Room in college dormitories or in private houses,	39 00	110 00
Board, $6 per week,	216 00	216 00
Laundry, 50 to 85 cents a week,	18 00	30 00
Laboratory fees,	5 00	20 00
Books, stationery and miscellaneous items,	17 00	44 00
	$300 00	$425 00

[1] This statement applies to those registering as regular or unclassified students.

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between $300 and $425 per year.

Initial Charges.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee,	$5 00	-	-
Board (if at college dining hall) four weeks in advance,	24 00	$24 00	$24 00
Assessment for support of Social Union,	1 50	1 50	1 50
Laboratory fees,	5 00	5 00	2 00–10 00
Room rent (if in college dormitory),	-	-	12 00–20 00
Student tax for support of athletics,[1]	8 00	8 00	8 00
Student tax for support of nonathletic activities,[1]	2 50	2 50	2 50

[1] While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

Laboratory Fees.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

Agronomy: —	Per Term.
Course 27, 3,	$1 50
Course 50, 1,	2 00
Course 51, 3,	2 00
Course 75, 1,	1 50
Course 76, 3,	1 50

	Per Term.
Animal husbandry: —	
Course 1, 1 and 2,	$1 00
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 50, 2,	1 50
Course 78, 2,	1 00
Dairying: —	
Course 50, 1,	2 50
Course 51, 3,	2 50
Course 75, 2,	2 00
Course 76, 3,	3 00
Course 77, 1,	2 50
Farm administration: —	
Course 75, 2,	1 50
Course 76, 3,	1 50
Poultry husbandry: —	
Course 51, 1,	2 50
Course 53, 3,	3 00
Course 55, 3,	2 50
Course 76, 1,	2 00
Course 77, 1,	2 00
Rural engineering: —	
Course 25, 1,	1 50
Course 26, 2,	1 50
Course 76, 1,	1 50
Course 77, 2,	1 50
Course 78, 3,	1 50
Floriculture: —	
Course 50, 1,	2 50
Course 51, 2,	2 50
Course 52, 3,	2 50
Course 53, 1,	2 50
Course 75, 1,	2 00
Course 76, 3,	2 00
Course 77, 2,	2 50
Course 78, 3,	2 50
Forestry: —	
Course 50, 1,	2 00
Course 51, 2,	3 00
Course 75, 1,	4 00
Landscape gardening: —	
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	4 00
Course 76, 2,	4 00
Course 77, 3,	4 00
Course 79, 3,	2 00
Vegetable gardening: —	
Course 50, 3,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Pomology: —	
Course 75, 1,	3 00
Course 76, 2,	3 00

	Per Term.
Drawing: —	
Course 25, 1,	$3 00
Course 26, 2,	3 00
Botany: —	
Course 3, 3,	3 00
Course 25, 1,	3 00
Course 26, 2,	3 00
Course 50, 1,	3 00
Course 51, 2,	5 00
Course 52, 1,	4 00
Course 53, 2,	4 00
Course 54, 3,	4 00
Course 55, 1,	5 00
Course 56, 2,	5 00
Course 75, 1,	5 00
Course 76, 2,	5 00
Course 77, 3,	5 00
Course 78, 1,	5 00
Course 79, 3,	5 00
Course 80, 3,	5 00
Course 82, 2,	5 00
Course 83, 3,	5 00
Course 84, 2,	5 00
Course 85, 3,	5 00
Entomology: —	
Course 50, 1,	1 00
Course 51, 2,	1 00
Course 53, 1,	1 00
Course 54, 2,	1 00
Course 55, 3,	1 00
Course 75, 3,	2 00
Course 76, 1,	3 00
Course 77, 2,	3 00
Course 78, 3,	3 00
Chemistry: —	
Course 1, 1,	3 00
Course 2, 2,	3 00
Course 3, 3,	3 00
Course 4, 1,	3 00
Course 5, 2,	3 00
Course 6, 3,	3 00
Course 25, 1,	4 00
Course 26, 2,	4 00
Course 27, 3,	5 00
Course 30, 3,	4 00
Course 51, 1,	5 00
Course 52, 2,	5 00
Course 62, 3,	5 00
Course 65, 3,	4 00
Course 76, 1,	5 00
Course 77, 2,	5 00
Course 80, 1,	5 00
Course 90, 2,	5 00
Course 91, 3,	5 00
Course 92, 2,	5 00
Course 93, 3,	5 00
Course 94, 2,	5 00
Course 95, 3,	5 00
Mathematics and engineering: —	
Course 27, 3,	2 00
Course 78, 3,	2 00

	Per Term.
Microbiology: —	
Course 50, 1, 2 and 3,	$5 00
Course 51, 2 and 3,	5 00
Course 52, 3,	5 00
Course 75, 2,	5 00
Course 76, 3,	5 00
Course 80, 2,	5 00
Course 81, 1,	5 00
Course 82, 1,	5 00
Course 83, 1,	5 00
Physics: —	
Course 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	3 00
Course 52, 3,	3 00
Veterinary science: —	
Course 78, 1,	2 00
Course 79, 1,	2 00
Course 80, 3,	2 00
Course 85, 1,	2 00
Course 86, 2,	2 00
Course 87, 3,	2 00
Zoölogy and geology: —	
Course 25, 1,	3 00
Course Zoölogy 27, 3,	3 00
Course 50, 1,	3 00
Course 51, 2,	4 00
Course 52, 3,	4 00
Course 53, 1,	4 00
Course 54, 2,	3 00
Course 55, 3,	3 00
Course 58,	2 00
Course 75, 1,	3 00
Course 76, 2,	3 00
Course 77, 3,	3 00
Course 78,	2 00
Course 79,	2 00
Rural journalism: —	
Course 53, 1,	2 00
Course 54, 2,	2 00
Course 55, 3,	2 00
Course 77, 1,	2 00
Course 78, 2,	2 00
Course 79, 3,	2 00
Course 80, 1,	2 00
Course 81, 2,	2 00
Course 82, 3,	2 00
Music (each course),	3 00

Rooms.

Students are expected, as far as possible, to occupy rooms in the college dormitories. Students who do not live in the college dormitories must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the dean. The in-

spection of student quarters is in charge of the commandant. At the end of each college year all unoccupied rooms will be thrown open for selection, and will be assigned to students according to classes. Freshmen will be assigned rooms according to the date of application.

Women students are expected to occupy rooms in the college dormitory and such houses or apartments as the college may provide. No woman student will be allowed to room in a private house without a special written permission from the dean.

Student Aid.

Self Help. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least $150 and preferably $250 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and twenty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Applicants are required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which they reside, explaining the necessity of the applicant's need of assistance. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Special Notice to Needy Students. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the president for discipline.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At

present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students: —

Management of the Infirmary.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall who is designated as Supervisor of the Infirmary. Miss Elizabeth Olmsted the resident nurse, is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of $1.50 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out patients for miscellaneous treatment of a minor character.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(*a*) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(*b*) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(*c*) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(*d*) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.

General Exercises.

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about ten years ago. All students become members of the union by paying a small fee. The union is designed to become the center of student interests. In North College it has a trophy room and a large lounging room for music, reading and study; in the basement of this building there is also a game room for pool and billiards. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association is active both socially and religiously. A Catholic club has also been organized.

The musical organizations include an orchestra, a mandolin club and a glee club. These furnish music for college meetings, and occasionally give concerts at the college and at other places. A military band is maintained as part of the cadet corps.

A dramatic club has been organized, and each year presents a play.

The Public Speaking Council represents the students' interest in debate and oratory.

The Athletic Association represents in the college the interests of football, baseball, track, hockey and basket ball.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

The college publications are the "Massachusetts Collegian" published weekly by the student body, and the "Index," published annually by the members of the junior class.

The Stockbridge Club is an organization of students especially interested in practical agriculture and horticulture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

Clubs also exist in the Departments of French, Entomology, Floriculture, Landscape Gardening, Zoölogy and Agriculture Economics.

There has recently been organized a Collegiate Country Life Club, the membership of which is composed of faculty and students who are particularly interested in the study of country life problems.

A nonathletics student activities board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the musical clubs, dramatic club and student publications.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is $5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of $10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest fifth of the senior class who have attained an average grade of at least 85 per cent. during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes offered in 1914 were: —

Agriculture. — The Grinnell prizes, given by Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, for excellence in theoretical and practical agriculture. Three prizes, $25, $15, $10. The contest is open to those senior students whose record on the registrar's books shows an average standing of 80 or above for the technical work taken in the Divisions of Agriculture and Horticulture during the junior and senior years. Applicants should register with the head of the Division of Agriculture before noon, June 2, 1918.

Animal Husbandry. — The F. Lothrup Ames prize, given by F. Lothrup Ames, Langwater Farms, North Easton, Mass., consisting of $150 a year, offered for a period of five years, beginning 1912, to be given to the three students standing highest in the work of advanced live stock judging, and to be used in defraying their expenses incurred by participation in the students' judging contest at the National Dairy Show, Chicago.

Botany. — The Hills prizes, given by Henry F. Hills of Amherst, amount to $35 annually. Competition is open to members of the senior, junior and sophomore classes as follows: for the best herbarium, $20; for the second best herbarium, $15. No collection deemed unworthy of a prize will be considered.

Public Speaking. — The Burnham prizes are awarded as follows: to the students delivering the best and second best declamations in the Burnham

contest, $15 and $10, respectively. The preliminary contests in declamation are open, under certain restrictions, to freshmen and sophomores.

The Flint prizes are awarded as follows: to the students delivering the best and second best orations in the Flint contest, a gold medal and $20 and $15, respectively. The preliminary contests in oratory are open, under certain restrictions, to all regular students.

The prizes in debate are awarded as follows: to each of the three students ranking highest in the annual debating contest, a gold medal and $15. The preliminary contests in debate are open, under certain restrictions, to all regular students.

Equipment.

Agricultural Education. — The courses in this department are planned primarily for those who are preparing to teach. The work is carried on by means of lectures, library and demonstrations. There is also equipment for conducting children's gardens on the campus. Instruction in school gardens constitutes a part of the practice work of those training for the occupation of teaching. Some practice work in teaching is done in the grammar grades of the Amherst schools, and in the agricultural departments of Hopkins' Academy, and Smith's Agricultural School at Northampton. This department is also intimately related to the matter of recommending candidates for teachers' certificates.

Agronomy. — The work in agronomy is carried on by means of lecture, laboratory and field work. The soil laboratories are located in the basement of Stockbridge Hall, and include an elementary laboratory with locker equipment for 200 men, and desk space for four divisions of 50 men each, and an advanced soil laboratory for the work of upper classes, with locker space for 80 men. This laboratory is also equipped with balance room, centrifuge room, steam ovens and moisture cabinets. There is also a workroom attached, equipped with power for grinding soils, fodders and the like.

The crop laboratories are located on the second floor of Stockbridge Hall, the room for seed study being at the south end and allowing for sections of 50 men each. The laboratory for cereal and forage crop work is at the north end of the building, and has locker equipment for 64 men. This laboratory is equipped with large steam ovens, constant temperature electric ovens, Brown-Duval moisture apparatus and ovens for seed germination. Attached is a balance room and also a storeroom; while on the fourth floor of Stockbridge Hall is a room equipped for the storage of seed corn, grains and grasses.

Animal Husbandry. — An accurate and definite knowledge of the market types and grades, and of the various breeds of live stock, is fundamental to the work in this department. The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180, and which is fully adapted to the requirements. There are upwards of 125 head of dairy cattle of various ages available for class-room work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Chester White pigs are maintained. The college possesses pure-bred Percherons besides many work teams of different types, which are available for class-room purposes. A set of plaster of Paris models of

individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different foodstuffs available for the use of the New England farmer, are included in the equipment for this work. An excellent set of upward of 250 lantern slides, portraying the leading prize-winning, producing and breeding animals of the leading breeds, — horses, cattle, sheep and swine, — belongs to this department, and is regularly used in instructional work. This equipment is being added to from time to time as funds are available.

Botany. — The Department of Botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for freshman and sophomore work, and one for junior and senior work; a laboratory for plant physiology, which is well supplied with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc.; and three rooms specially fitted for graduate students. The experiment-station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experimental work and for housing material often needed for instruction.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with modern compound microscopes, dissecting microscopes, microtomes and other apparatus, and a large series of charts. In addition to a physiological laboratory the basement contains a seed and soil room, and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe and other tools and appliances. The herbarium contains about 18,000 sheets of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and over 20,000 specimens of fungi.

Chemistry. — The college Department of Chemistry occupies the entire building known as the chemistry laboratory. The basement is used for the storage of apparatus and chemicals. The first floor contains large laboratories devoted to organic, physiological and physical chemistry, and qualitative analysis. The second floor is occupied by the general lecture room, by offices for the several members of the staff and by laboratories for analytical chemistry. The third floor has been fitted for work in general chemistry, and has desk room and hoods sufficient to accommodate 90 students at one time. Each place is supplied with reagents and apparatus for independent work. This floor is also occupied by a lecture room that will seat 56 students.

The entire laboratory is well equipped with the necessary apparatus and chemicals for all students who desire to perfect themselves as expert chemists, or who wish to study chemistry as a supplement to some other line of practical or scientific work. The equipment includes a valuable and growing collection of specimens and samples of minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products and artificial preparations of mineral and organic compounds; and also a series of preparations for illustrating the various stages of different manufactures from raw material to finished product.

Dairying. — The dairy work is given in Flint Laboratory, a new building designed for the dairy department. It contains large, well-lighted, sanitary and well-equipped laboratories. The equipment is new and of the best types of market milk and farm dairy machines.

Dining Hall. — Draper Hall, a brick colonial building equipped with the modern conveniences of a dining hall, was opened in 1903. The dining service is under the supervision of the college. The building contains a limited number of rooms for young women students.

Drawing. — The class in drawing occupies a room on the second floor of Wilder Hall. It is equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

Entomology. — *General Entomological Laboratories.* — The equipment for work in entomology is perhaps unexcelled in this country. In the new fireproof entomological and zoölogical building, first used in the fall of 1910, are fine lecture rooms, laboratories and museums for use in the different courses. The senior laboratory will accommodate 70 students at one time; a desk, equipped with compound microscope and accessories, together with glassware, reagents, etc., and supplied with electric light and gas, is provided for each student. Dissecting microscopes, microtomes and other apparatus are available for use. The graduate laboratory is similarly equipped, and it will accommodate 20 students. The large and rapidly growing collections of insects are in a room adjoining both laboratories. In the library of the building is an excellent collection of the more important books and journals treating of entomology, and many more are accessible in the college library and in the private libraries of the professors, in all making available more than 25,000 volumes, many of which cannot be found elsewhere in the United States. A card catalogue giving references to the published articles on different insects contains more than 60,000 cards, and is the largest index of its kind in the United States, and probably in the world. In the basement is a pump room where may be studied the construction of the different types of spray pump and methods of repairing them; hose, couplings, nozzles and the other parts of spraying outfits are provided, not only for examination but for use. In another room chemical desks and apparatus provide opportunities for the determination of the impurities and adulterations of insecticides. As the insectary of the Massachusetts Agricultural Experiment Station is in the same building the facilities it offers are also available. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students. Photographic rooms with cameras and other photographic apparatus are provided, and the large greenhouses, gardens, orchards and grounds of the college offer further opportunities for the study of injurious insects under natural conditions.

Farm Administration. — The college farm of 250 acres is under the general supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on,

of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Floriculture. — The Department of Floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a Department of Floriculture better equipped than this. There has been erected a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of plant materials.

Forestry. — The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is located on the college farm. Extensive forests containing every variety of tree common to New England are within walking distances of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports and all the best books on forestry subjects. The Mount Toby Demonstration Forest comprises approximately 750 acres along the line of the Central Vermont Railroad between the stations of Leverett and Montague. It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration and management. Improvement cuttings and cuttings for utilization are conducted by the Forestry Department, and every opportunity is offered the student to familiarize himself with the practical side of forest work.

Geology. — A large, well-lighted laboratory for geology, 27 by 50 feet, is in the basement of the new building for entomology, zoölogy and geology. This is equipped with cabinets, models, charts and a teaching collection of rocks. It has a seating capacity of 50 persons. Adjoining this is a smaller laboratory, 21 by 27 feet, for mineralogy, supplied with gas and cabinets for models, crystals and minerals. There is also a small laboratory for grinding thin sections, and a private laboratory, 6 by 19 feet, for analysis work. The geological museum is 27 by 48 feet. It has six large cases for exhibition purposes. The equipment for geology is being enlarged. At present, in addition to the general items mentioned above, it consists of a petrographic microscope, an illustrative series of thin sections, a small collection of invertebrate fossils, some casts of vertebrate fossils, a collection of the building stones of Massa-

chusetts, and a duplicate set of the Edward Hitchcock survey collection of the rocks and minerals of Massachusetts.

Heating, Lighting and Power. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop and well-equipped carpenter shop.

Landscape Gardening. — The work in landscape gardening is developed in a strong technical four-year course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for thorough work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

Library. — The library — stack room, reading room and office — occupies the entire lower floor of the Chapel-library building. It contains about 60,000 volumes and a large number of bulletins, farm papers and other material, which is being put into good working order as fast as possible. Works on agriculture, horticulture, botany, entomology and the various sciences predominate, but literature, history and sociology are well represented and receive due attention. The reading room provides a good variety of popular and technical periodical literature, encyclopedias and general reference books.

The library is being reclassified and recatalogued in order to make the splendid material accessible and of the greatest working value. Every effort is being made toward developing the college library into a vital intellectual center, of equal value to every student, teacher and teaching department on the college campus. Consequently only the most cordial relations are cherished, and the fewest and most imperative rules concerning the circulation of books and deportment are enforced. An agricultural reference library is maintained in Stockbridge Hall, and department libraries are also maintained in some of the other buildings on the campus.

Occasional lectures are given to regular and short-course students in order to make the best use of the library equipment. Emphasis is laid upon the card catalogue, periodical indexes, bibliographies and guides, and the large collections of United States Department of Agriculture and experiment station literature.

Library hours are from 7.30 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1.30 P.M. on Sundays in term time. Shorter hours prevail during vacation.

Vegetable Gardening. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class

rooms and laboratory particularly equipped for market gardening. A good library of works on vegetable gardening is available.

Mathematics and Civil Engineering. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 3 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 3 wye levels, 2 dumpy levels, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Microbiology. — The department now occupies a newly erected building, and has at command laboratories, research rooms, offices and class-rooms, of thoroughly modern completeness.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The main floor is used for basket ball, indoor baseball and hand ball. The gallery has been fitted up as a special exercise and gymnastic room, and is equipped with modern developing apparatus, including parallel bars, horses, bucks, chest weights, dumb-bells, Indian clubs and striking bags. An outdoor board track enables students to secure track practice through the winter, and two ice hockey rinks give ample opportunity for hockey practice. Credit is given to all students taking part in outdoor activities. "Treks" are held twice a week, and whenever possible snowshoe and skiing hikes are also held. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium has been fitted with a shower-room. The gymnasium classes are held the last two hours in the morning and the last two hours in the afternoon, but students may use the gymnasium at other times for exercise purposes by arrangement with the department. The regulation costume for class exercise consists of a white track suit and white rubber-sole shoes.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer,

a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Pomology. — The Department of Pomology has 45 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. There are also two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears and peaches, in natural colors. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1916–17, for instance, apples for class use were received from Idaho, Missouri, Utah, Washington, Maine, Connecticut, Pennsylvania, Montana, Minnesota, Nebraska, Kentucky, Iowa, Wisconsin, Michigan, New York, Kansas, Colorado, Oregon, New Jersey and Vermont, besides collections of grapes from California and citrous fruit from Florida and Texas. From the college fruit plantations the following fruits were available: grapes, fifty varieties, representing three native American species and several hybrids; twenty varieties of peaches, twenty varieties of pears, twenty-five varieties of plums, one hundred varieties of apples.

Poultry Husbandry. — The poultry plant consists of about 9 acres of land sloping gently to the west. The soil is a fine, rich, sandy loam, well drained. At present the buildings consist of an incubator cellar, 22 by 34 feet, with a capacity of 4,000 eggs, over which is a demonstration building; a pipe brood house (open-pipe system), 14 by 72 feet, which will accommodate 1,200 chickens; a long laying house, 14 by 180 feet, which accommodates 500 layers and furnishes facilities for student work in pen management; a laboratory, 14 by 80 feet, for killing, picking, dressing, crate fattening, cramming, etc.; a storage building, 28 by 42 feet, for experimental incubation, poultry carpentry, poultry mechanics and storage; an experimental breeding house, 18 by 60 feet; a combination laying, testing and breeding house, 18 by 72, for experimental purposes, and a model laying house, 18 by 30, for 100 hens; the 6 old experiment-station buildings, each 12 by 18 feet, to be used as breeding houses; 14 colony houses; 8 growing crops; a manure shed, 14 by 18 feet; and an oil house, 10 by 12 feet. Instruction in this department is given in the form of lectures, demonstrations and practical work. The practical work consists of poultry carpentry, caponizing, killing, picking, dressing, packing and selling poultry; pen management and fattening; running incubators and brooders, etc. At present the stock consists of 20 leading varieties of poultry. The aim of the department is to keep good specimens of all the most popular varieties of chickens, ducks and geese, so that a thorough course in poultry judging may be given, and that visitors may find the inspection of our stock an education in itself.

Public Speaking. — In connection with the work in public speaking, three regular contests are held during the year. The Burnham contest in declamation is open to freshmen and sophomores; the Flint contest in oratory and the annual debating contest are open (under restrictions) to all regular students. These contests offer a very practical and necessary experience to all students interested in improving themselves in the art of public speaking. Prizes are given for excellence in the contests. Intercollegiate contests are arranged by the Public Speaking Council. One credit is given, except to freshmen, for a year of work in the College Debating Club.

Rural Engineering. — This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop building is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. A saw table is available for getting out material. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines and pumps. A small dynamo and switchboard are used in the study of farm-lighting systems.

The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Rural Journalism. — The news-room, or laboratory, for the courses in rural journalism, is equipped with typewriting machines, copy tables, representative newspapers, reviews, agricultural papers, and trade journals concerning journalism and writing, selected books on journalism, reference books, and a considerable "morgue" of indexed pamphlets, monographs and clippings on farming, rural life and rural industry, contemporary events, etc. (loan collection). The news-room and offices are in the recently completed Stockbridge Hall, near the division library of the Division of Agriculture.

Veterinary Science. — The department of Veterinary Science occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a

growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Zoölogy. — The college offers increased facilities for the study of zoölogy. In the new building for entomology, zoölogy and geology are spacious laboratories for both undergraduate and graduate work. On the first floor is a large sophomore laboratory, 27 by 100 feet, with a present seating capacity of 100 persons. Adjoining this is a smaller room, 20 by 27 feet, for junior and senior courses. All laboratories are equipped with gas. The equipment consists of 80 compound microscopes and accessories, 70 dissecting microscopes, microtomes and accessories, paraffine baths, incubator, dissecting instruments, glassware and other necessary apparatus.

The large amphitheater lecture hall is used jointly by the Departments of Entomology and Zoölogy-Geology. It is equipped with charts and models. The zoölogical museum is drawn upon at all times for illustrative material. The zoölogical museum is 27 by 48 feet. The main room is on the first floor of the building. Above this, on a level with the second floor, is a large gallery. On the main floor are 8 large wall cases and 5 large floor cases for exhibition purposes. The gallery has 1 large wall case and 3 floor cases with space for 9 additional cases. The zoölogical collection consists of nearly 12,000 specimens. All the chief phyla are represented. Adjoining the museum is a preparator's room for the curator. The museum is open to the public from 1 to 5 P.M. on Saturdays, and on other week days from 3 to 6 P.M. The curator is Professor Gordon.

Awards and Prizes.

Grinnell Prizes. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York to those members of the senior class who pass the best, second best, and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows: —

First prize, $25, awarded to Elizabeth Emery Additon.

Second prize, $15, awarded to Louis Martin Lyons.

Third prize, $10, awarded to Gaylord Arthur Newton.

General Improvement. — The Western Alumni Association prize, given to that member of the sophomore class who, during the first two years in college, has shown the greatest improvement in scholarship, character and example, was $25, which was awarded to Warren Montague Dewing.

Public Speaking. — The Burnham prizes were awarded to the students delivering the best and second best declamations as follows: $25, divided equally between John Alexander Crawford, 1920, and Donald Hiram Smith, 1920.

Military Honors. — The following-named students were recommended for appointment as Lieutenants in the Regular Army of the United States, and their names were sent to the Adjutant-General of the army and to the Adjutant-General of their different States: —

Cadet Maj. John Alden Chapman.

Cadet Capt. Marshall Olin Lanphear.

Cadet Capt. Franklin Harwood Canlett.

Cadet Capt. Louis Martin Lyons.

Cadet Capt. William Albert Foley.

The following-named students were recommended for appointment as Lieutenants in the infantry arm of the militia of the several States, and their names were sent to the Adjutant-General of the several States: —

Cadet First Lieut. George Wendell Barton.
Cadet First Lieut. Ralph Stanley Leonard.
Cadet Second Lieut. Harold Leo Sullivan.
Cadet Second Lieut. Carlton Tower Smith.
Cadet Serg. Oliver Goodell Pratt.
Cadet Corp. Arthur Dana Tilton.
Cadet Corp. Robert Lucius Boyd.

Secretaries of Alumni Associations.

Associate Alumni of the Massachusetts Agricultural College.
Secretary: Dr. Charles A. Peters, 1897, Amherst, Mass.
Alumni Secretaries' Association of the Massachusetts Agricultural College.
Secretary: Ralph J. Watts, 1907, Amherst, Mass.
Alumni Club of Massachusetts.
Secretary: Edward C. Edwards, 1914, 50 State Street, Boston, Mass.
Connecticut Valley Association of the Massachusetts Agricultural College.
Secretary: Robert S. Fay, 1913, Monson, Mass.
Massachusetts Agricultural College Club of New York.
Secretary: Walter L. Morse, 1895, Grand Central Terminal, New York.
Massachusetts Agricultural College Club of Washington, D. C.
Secretary: G. A. Billings, U. S. D. A., Office of Farm Management, Washington, D. C.
Western Alumni Association of the Massachusetts Agricultural College.
Secretary: Theodore J. Moreau, 1912, 815 Steinway Hall, Chicago, Ill.
Massachusetts Agricultural College Pacific Coast Alumni Association.
Secretary: Thomas F. Hunt, 1905, Berkeley, Cal.
Massachusetts Agricultural College Club of Hawaii.
President: Allen M. Nowell, 1897, Honolulu, T. H.
Massachusetts Agricultural College Club of Worcester County.
Secretary: Charles H. White, 1909, 11 Foster Street, Worcester, Mass.
Massachusetts Agricultural College Club of Marlborough.
Secretary: William L. Howe, 1908, Marlborough, Mass.
Massachusetts Agricultural College Club of Connecticut.
Secretary: Herbert J. Baker, 1911, Storrs, Conn.

Class Secretaries.

Class of —	Secretary.	Secretary's Address.
1871	E. E. Thompson,	5 Jacques Avenue, Worcester, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	D. G. Hitchcock,	Warren, Mass.
1875	P. M. Harwood,	Room 136, State House, Boston, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	Atherton Clark,	231 Waverley Avenue, Newton, Mass.
1878	C. O. Lovell,	201 Darke Block, Regina, Saskatchewan, Can.
1879	R. W. Swan,	41 Pleasant Street, Worcester, Mass.
1880	Alvan L. Fowler,	413 Federal Building, Philadelphia, Pa.
1881	J. L. Hills,	59 North Prospect Street, Burlington, Vt.
1882	G. D. Howe,	38 Whittier Avenue, Springfield, Mass.
1883	J. B. Lindsey,	Amherst, Mass.
1884	E. A. Jones,	New Canaan, Conn.
1885	E. W. Allen,	1923 Biltmore Street, Washington, D. C.
1886	Winfield Ayres,	616 Madison Avenue, New York City.
1887	F. H. Fowler,	Shirley, Mass.
1888	H. C. Bliss,	14 Mechanic Street, Attleboro, Mass.
1889	F. W. Davis,	85 Colberg Avenue, Roslindale, Mass.
1890	David Barry,	398 Walnut Street, Newtonville, Mass.
1891	H. T. Shores,	177 Elm Street, Northampton, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Hathorne, Mass.
1894	S. F. Howard,	Northfield, Vt.
1895	E. A. White,	Ithaca, N. Y.
1896	A. S. Kinney,	South Hadley, Mass.
1897	C. A. Peters,	Amherst, Mass.
1898	W. S. Fisher,	Peace Street Grammar School, Providence, R.I.
1899	Herbert W. Dana,	9 Oliver Street, Salem, Mass.
1900	E. K. Atkins,	15 Hubbard Avenue, Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass.
1902	H. L. Knight,	1420 Buchanan Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	East Holliston, Mass.
1905	A. D. Taylor,	1900 Euclid Avenue, Cleveland, Ohio.
1906	Richard Wellington,	2314 Scudder Street, St. Paul, Minn.
1907	Clinton King,	31 Elm Street, Springfield, Mass.
1908	S. J. Wright,	39 Wall Street, Norwalk, Conn.
1909	O. B. Briggs,	1011 Fidelity Building, Baltimore, Md.
1910	F. L. Thomas,	Auburn, Ala.
1911	L. M. Johnson,	Newtown, Conn.
1912	F. S. Madison,	East Greenwich, R. I.
1913	B. W. Ellis,	575 Main Street, South Weymouth, Mass.
1914	L. Ernest Smith,	Pittsford, Vt.
1915	P. F. Whitmore,	Sunderland, Mass.
1916	Perez Simmons,	34 Boylston Street, Pittsfield, Mass.
1917	John Dizer,	– – –

Degrees Conferred and Roll of Students.

Degrees Conferred — 1918.

Master of Landscape Architecture (M.L.A.).

Root, Irving Campdoras, Kansas City, Kansas, Kansas State Agricultural College, B.Sc.

Bachelor of Science (B.Sc.).

Additon, Elizabeth Emery,	Newton Center.
Barton, George Wendell,	North Sudbury.
Boyd, Robert Lucius,	East Lynn.
Bruce, Walter Griffith,	Stafford Springs, Conn.
Buchanan, Walter Gray,	Chicopee.
Canlett, Franklin Harwood,	Bedford.
Carlson, Fred Albert,	Pittsfield.
Carter, Thomas Edward,	Andover.
Chapman, John Alden,	Salem.
Clark, Stewart Sandy,	Holyoke.
Cotton, Elwyn Page,	Woburn.
Davis, Dwight Shaw,	Woburn.
Edes, David Oliver Nourse,	Bolton.
Emmerich, Louis Philip,	Paterson, N. J.
Ferris, Adaline Lawson,	Ridgefield Park, N. J.
Foley, William Albert,	Palmer.
Foster, Roy Wentworth,	Lynn.
Haines, Foster Kingsley,	Peabody.
Hayes, Olin Henry,	Lawrence.
Hill, Edmund Baldwin,	Rutherford, N. J.
Hilliker, Harriet Franklin,	East Lynn.
Holmes, George Frederick,	Ipswich.
Howes, Donald Francis,	Ashfield.
Hunnewell, Paul Fiske,	Winthrop.
Illman, Margaret Keble,	Schuyler Falls, N. Y.
Johnson, Birger Lars,	Dorchester.
Lanphear, Marshall Olin,	Windsor, Conn.
Lawrence, Lewis Henry,	Falmouth.
Lawton, Ralph Wilber,	Fall River.
Leonard, Ralph Stanley,	Melrose.
Levine, Darwin Solomon,	Sherborn.
Loring, William Rupert,	Great Barrington.
Lyons, Louis Martin,	Boston.
Mallorey, Alfred Sidney,	Lynn.
McRae, Herbert Rankin,	Malden.
Mower, Carl Taft,	Barre, Vt.
Newton, Gaylord Arthur,	Durham, Conn.
Popp, Edward William,	Albany, N. Y.
Pratt, Oliver Goodell,	Salem.
Preble, John Nelson,	Jamaica Plain.
Raymond, Clinton Rufus,	Beverly.
Reumann, Theodore Henry,	New Bedford.
Ritter, Ernest,	New Britain, Conn.
Rosequist, Birger Reignold,	Brockton.
Russell, Howard Leigh,	Worcester.
St. George, Raymond Alexander,	East Lynn.

Sanborn, Dean Waldron,	Conway.
Schlough, George Hamer,	Waltham.
Schwartz, Louis,	Melrose.
Smith, Carleton Tower,	West Newton.
Smith, Sidney Summer,	Roslindale.
Stjernlof, Axel Uno,	Worcester.
Sullivan, Harold Leo,	Lawrence.
Tilton, Arthur Dana,	Wellesley.

First Term Registration, 1918-19.

Graduate Students.

Bailey, Esther, ... Arlington.
A.B., Wellesley College.
English, Harriet Holt, ... New Haven, Conn.
A.B., Vassar College.
Gordon, Thomas B., ... Lexington, Ky.
B.S.Agr., University of Kentucky.
Jones, Linus H., ... Milford.
B.Sc., Massachusetts Agricultural College.
Lewis, Daniel J., ... Amherst.
B.Sc., Massachusetts Agricultural College.
Morgan, Ezra Leon, ... Amherst.
A.B., McKendree College.
M.A., University of Wisconsin.
Mutkekar, Satwaji Gundoji, ... Belgaum, India.
B.Agr., Poona Agricultural College.
M.Sc., Massachusetts Agricultural College.
Neill, James, ... Clarion, Pa.
B.S., Alleghany College.
Sullivan, Harold Leo, ... Lawrence.
B.Sc., Massachusetts Agricultural College.
Wheeler, Mrs. Mae, ... Amherst.
B.Sc., Massachusetts Agricultural College.

Class of 1919, S. A. T. C.

Bagg, Quincy Austin, ... South Hadley.
Blanchard, Carlton Douglas, ... Uxbridge.
Bond, Herbert Richard, ... Needham.
Boyce, Alan Freeman, ... Melrose.
Burt, Henry John, ... Arlington.
Chisholm, Robert Dudley, ... Melrose Highlands.
Collins, Robert Burleigh, ... Rockland.
Erickson, Gunnar Emanuel, ... West Lynn.
Evans, Myrton Files, ... West Somerville.
Faneuf, Ambrose Clement, ... West Warren.
Faxon, Paul, ... Wellesley Hills.
French Willard Kyte, ... Worcester.
Jewell, Charles Henry, ... Merrimac.
Mather, William, ... Amherst.
Smith, Wendell Frederick, ... Pittsfield.
Stafford, Irving Boynton, ... Fall River.
Stockwell, Ervin Sidney, Jr., ... Sharon.
Sutherland, Ralph, ... Cambridge.
Sweeney, William Joseph, ... Dorchester.
Taylor, Edmund Billings,[1] . . . . . Wollaston.

Class of 1920, S. A. T. C.

Apsey, George Willis, Jr., ... Winchester.
Armstrong, Philip Brownell, ... Rutherford, N. J.
Bacon, Milo Roderick, ... Leominster.

[1] Enrolled.

Ball, Harry Abraham,	Bridgewater.
Ball, Lorin Earl,	Amherst.
Bigelow, Henry Charles,	Millville, N. J.
Brown, Roy Robertson,	Hudson.
Bunker, Carroll Wooster,	West Somerville.
Card, Ralph Hunter,	Somerville.
Carleton, John Foxcroft,	East Sandwich.
Center, Arthur Edwin,	Springfield.
Clough, Alfred Arnold,	Wollaston.
Cole, Frederick Eugene, Jr.,	South Portland, Me.
Crawford, John Alexander,	Allston.
Davenport, Frank Edward,	Dorchester.
Davis, Orrin Chester,	Belchertown.
Delahunt, John Kersey,	Boston.
Derick, Glendon Robert,	Clinton.
Doucette, Charles Felix,	Melrose.
Farnsworth, Richard Wasgatt,	Lancaster.
Fuller, Lorenzo,	Lowell.
Graves, Carlisle Ferrin,	Stamford, Conn.
Hale, Frank Thompson Caldwell,	Byfield.
Hamlin, Hazen Wolcott,	North Amherst.
Harrington, Harold Leon,	Lunenburg.
Haynes, Charles Francis,	Canton.
Holland, Frank Harold,	Shrewsbury.
Holloway, John William,	Taunton.
Jakeman, Brooks Franklin,	Winchester.
Lambert, Richard Bowles,	Gleasondale.
Littlefield, John Edwin,	Lynn.
Lothrop, Earle Daniel,	West Bridgewater.
Lyons, Henry Egmont,	Boston.
Meserve, Albert Wadsworth,	Framingham.
Oppe, Herman DeWitt,	Coscob, Conn.
Peckham, William Harold,	Newport, R. I.
Readio, Philip Adna,	Florence.
Redding, George Kenneth,	Melrose.
Sanderson, Ralph Hemenway,	Waltham.
Scott, Clifton William,	Buckland.
Simmons, Lester Winslow,	Dighton.
Stedman, Ralph Shaw,	Springfield.
Sullivan, Walter Mitchell,	Lawrence.
Taylor, Elliot Hubbard,	Shelburne.
Taylor, Thornton Greenwood,	Winchester.
Urquhart, John Wardrop,[1]	East Walpole.
Williams, Allan Carruth,	Rockland.

CLASS OF 1921, S. A. T. C.

Alger, James Warren,	Reading.
Allen, Henry Vaughn,	Arlington.
Andersen, Charles Henry,	Medford.
Baker, Russell Dexter,	Oxford, Me.
Bartlett, John Lloyd Burnham,	Westborough.
Bennett, James Stanley,	South Meriden, Conn.
Bowen, Willard Lee, Jr.,	Natick.
Brigham, John Dexter,	Sutton.
Brown, Charles Henry,	Winthrop.
Brown, Paul Wilfred,	Fiskdale.
Calhoun, Saltean Frederick,	Brookline.
Cascio, Peter Joseph,	Willimantic, Conn.
Coombs, Roger Conklin,	Peabody.
Cooper, Lawrence Melville,	Amherst.
Day, Roland Wight,	Medfield.

[1] Enrolled.

Dean, Herman Nelson,	Oakham.
Edman, George William,	Orange.
Evers, Joseph Daniel,	Malden.
Fisher, Leander Winsor,	East Lynn.
Fletcher, Francis Summers,	East Lynn.
Fogg, Lloyd Clarke,	Danvers.
Freeman, Stanley Leonard,	Needham.
Galusha, Mark Hampton,	Williamstown.
Geer, Herbert Leroy,	Three Rivers.
Gould, Robert Meredith,	Shelburne.
Hallett, Melvin Bernard,	Rockland.
Haskins, Harold Arthur,	North Amherst.
Howard, Frederic,	Needham.
Howard, Winthrop Wilmarth,	South Easton.
Johnson, Conrad John,	Campello.
Jones, Edson Temple,	Roslindale.
Kendall, Charles Donald,	Worcester.
Kile, Trueman Eugene,	Providence, R. I.
Kirkland, Lyle Lord,	Chester.
Lacroix, Donald Sewall,	Rowley.
Levine, Maurice Eleazer,	Sherborn.
Lockwood, George Russell,	Hyde Park.
Long, Albert Douglas,	Chicopee.
Mackintosh, Charles Gideon,	Peabody.
Marsh, Walter Ashton,	Jefferson.
Martin, Edward William,	Amherst.
McCarthy, Justin Jerimiah,	Arlington.
Mellen, Richard Adams,	Cambridge.
Millington, Walter Roy,	Maynard.
Park, Francis Edwin, Jr.,[1]	Stoneham.
Peck, Richard Charles,	Shelburne.
Pratt, Laurence Francis,	North Weymouth.
Preston, Everett Carroll,	Dorchester.
Quint, Isador Gabriel,	Roxbury.
Reed, Paul Malcolm,	Baldwinville.
Rice, Henry Lawrence,	Boston.
Robinson, Philip Luther,	New Bedford.
Rosoff, Samuel Nathaniel,	Springfield.
Sampson, Howard Jenney,	Fall River.
Sanford, Richard Herbert,	Westfield.
Slate, George Lewis,	Bernardston.
Sloan, Kenneth Wilson,	Amherst.
Smith, Julian Denton,	Far Rockaway, N. Y.
Spencer, Orville Holland,	West Haven, Conn.
Starkey, Robert Lyman,	Fitchburg.
Stevens, Ralph Shattuck,	Arlington.
Stiles, Harry Stephen,[1]	Lynn.
Wilson, Charles William Schragey, Jr.,	New Rochelle, N. Y.
Wood, Clarence Milton,	West Somerville.
Woodward, Ralph, Jr.,	Grafton.
Zercher, Frederick Kaupp,	Huntington, W. Va.

CLASS OF 1922, S. A. T. C.

Acheson, Roger Melvin,	New Bedford.
Bainton, Hubert Judson,	Hyde Park.
Baker, George Louis,	Amherst.
Barnes, Franklin Allen,	Lynn.
Barrows, Edward Fletcher,	Brattleboro, Vt.
Beal, James Allen,	Abington.
Beckwith, Robert Henry,	Worcester.
Bent, Leslie Dana,	Medfield.

[1] Enrolled.

Blessington, James Bernard,	Lynn.
Bridgman, William Eustace,	Belchertown.
Bromley, Stanley Willard,	Southbridge.
Bruce, Frederick Raymond,	Stafford Springs, Conn.
Buck, Charles Alfred,	Mansfield.
Burnham, Edwin Graham,	Springfield.
Carey, Edmund Thomas,	Springfield.
Cate, Herman Wood,	Ward Hill.
Chapin, Ellis Warren, Jr.,	Chicopee Falls.
Coles, Howard Finlay,	Tarrytown, N. Y.
Collins, Herbert Laurence,	Arlington.
Cross, Charles Sale,	Hingham Center.
Cummings, Robert,	Newton Center.
Davis, Harold Sanborn,	Belchertown.
DuBois, Howard Grace,	Springfield.
Eaton, James Harry,	Maynard.
Eberlein, William John,	Greenfield.
Eldridge, Dean Stratton,	Amherst.
Fenton, James Francis,	Amherst.
Frilen, Karl Arvid,	West Springfield.
Gilbert, Frank Albert, Jr.,	Watertown.
Giles, Clifton Forrest,	Newtonville.
Gowdy, Carlyle Hale,	Westfield.
Graves, James Addison,	Shelburne Falls.
Hawes, Leon Roy,[1]	Sudbury.
Hawley, Robert Roswell,	Brooklyn, N. Y.
Heathcote, Earl William,	Fall River.
Higgin, Albert Snyder,	Passaic, N. J.
Hooper, Francis Edwards,	Revere.
Hooper, Oliver Furbish,	Lynn.
Jackson, Belding Francis,	Belchertown.
Jacobs, Albert Fullerton,	Dudley.
Jost, Nelson Mynot,	Arlington.
Lawrence, Robert Parker,	East Greenwich, R. I.
Lawton, Harold Hayden,	Bradford.
Leonard, Earle Stanley,	Hyde Park.
Lewandowski, John Nepumcen,	Easthampton.
Lingham, Robert Marston,	Newton Highlands.
Lockhart, John Harold,	Tarrytown, N. Y.
Lovell, Hollis Reed,	East Falmouth.
Lowery, John Gordon,	Malden.
Lyons, Edgar Albion,	Methuen.
Lyons, John Joseph, Jr.,	Arlington.
MacArdle, Herbert Aloysius,	Worcester.
Moody, Kenneth Watts,	Brookline.
Moseley, Henry Samson,	Glastonbury, Conn.
Murray, Myron George,	Bradford.
Peck, William Henry,	Stow.
Phelps, Harley Proctor,[1]	South Williamstown.
Pickup, Ezra Alden,	Holyoke.
Rivkin, Julius Meyer,	Chelsea.
Roser, Conrad Herman,	Glastonbury, Conn.
Russell, Ralph,	Worcester.
Slobin, Harold Martin,	Worcester.
Smith, Stuart VanAlstyne,	Springfield.
Stebbins, Frederick Osborne,	Deerfield.
Stephan, Henry Wesley,	Jamaica Plain.
Stevens, Albert Webster,[1]	Arlington Heights.
Stevens, Seth Edward,	Reading.
Stowell, Preston Dyer,	South Weymouth.
Stubing, Ernest Stone,	New York, N. Y.
Sullivan, Joseph Timothy,	Lawrence.

[1] Enrolled.

Swift, Arthur Lawrence,	North Amherst.
Tanner, Willis,	Yokohama, Japan.
Task, Mortimer,	West Stoughton.
Taylor, Laroy Bearse,	Jamaica Plain.
Thompson, George Henry, Jr.,	Lenox.
Walker, Albert Nickerson,	Brookline.
Walsh, John Leonard,	Amherst.
Wason, Raymond,	Brookline.
Whitaker, Holden,[1]	Newton Highlands.

SPECIAL S. A. T. C.

Ackerstrom, Helmer Oscar,	Worcester.
Allison, Simmons Horton,	Rockland.
Almy, Roger Warren,	New Bedford.
Anderson, Gust William,	Brockton.
Andrews, Harold Frederick,	Farmington, Conn.
Andrews, John Hollis,	Vineyard Haven.
Arms, Philip Baxter,	Hopkinton.
Arms, Richard Woodworth,	Hopkinton.
Arnold, Randolph Thurston,	Grafton.
Barry, Charles Vincent,	Florence.
Beebe, Revere Hanney,	Uncasville, Conn.
Bellevue, Leon Wescott,	Chicopee Falls.
Bemis, Raymond Battles,	Spencer.
Benoit, George Norman,	Chicopee Falls.
Bliss, Charles Clinton,	Springfield.
Bodine, Clarence Leland,	Bellows Falls, Vt.
Brooks, Charles Foster,	Amherst.
Burr, Ralph Brewer,	Ludlow.
Callahan, Lawrence Nicholas,	South Deerfield.
Carlson, Walter Mauritz,	Northborough.
Carlson, William Augustus,	Greenfield.
Carter, Maynard Froude,	Springfield.
Chipman, William,	Easthampton.
Clapp, Horace Damon,	Easthampton.
Clark, Chester Frederick,	Fitchburg.
Coburn, Melvin Leroy,	Westfield.
Collins, Robert Purnell,	Sunderland.
Conant, Luman Binney,	Waltham.
Connell, Leo James,	Westford.
Cotton, Harry Morris,	Worcester.
Cottrell, Robert Rae,	New York, N. Y.
Couchon, George Arthur,	Easthampton.
Crane, Dominic Gregory,	Holyoke.
Culver, Roger Lewis,	Williamsburg.
Cunningham, Ralph Patrick,	Chicopee Falls.
Custer, Oliver Marshall,	Bellows Falls, Vt.
Denault, Edwin Aloysius,	Mittineague.
Dinsmore, Donald Newcomb,	Greenfield.
Dunn, Vincent Byrne,	Marlborough.
Emerson, Floyd Stimson,	Haverhill.
Emerson, Robert Richardson,	Westfield.
Fitzgibbon, William James,[1]	Northampton.
Flynn, Arthur James,	Montague City.
Frary, Frank Taylor,	Southampton.
Frazier, Robert Hicks,	Springfield.
Gallagher, George James,	Orange.
Gelling, Paul Richard,	Syracuse, N. Y.
Geoghegan, James Dewey,	Brighton.
Gerrish, Arthur Hermon,	Lowell.
Goodnow, Ernest Winford,	Shelburne Falls.

[1] Enrolled.

Goodnow, Lewis Weston,	Greenfield.
Gordon, Edward Michael,	Holyoke.
Gordon, Elliott Andrew,	Winchendon.
Graves, Reginald Sumner,	Bridgeport, Conn.
Griffin, Artemas Gage,	South Chelmsford.
Hadley, Russell Bradford,	Arlington.
Hart, Owen Stephen,	Meriden, Conn.
Henderson, Stanley Day,	Ward Hill.
Hitchcock, Richard Cheney,	New London, Conn.
Holley, George Gilbert,	Fiskdale.
Hopkins, Henry Herbert,	La Grande, Ore.
Horne, Edgar Robert,	Holyoke.
Howard, Elmer Smith,	South Easton.
Hubbard, Erwin Herbert,	Sunderland.
Hudson, Francis William,	Fairview.
Hugo, Alvin Ernest,	Worcester.
Hupfer, Franklin Oscar,	Easthampton.
Jarvis, Harold Nelson,	Lynn.
Jones, Edward Charles,	Wrentham.
Jones, Howard Francis,	Greenfield.
Jorgensen, Chester Daniels,	Haydenville.
Judd, Arthur Daniel,	West Hartford, Conn.
Keating, William Francis,	Holyoke.
Kemp, George Austin,	North Andover.
Kenney, Chester Davis,	Amherst.
Kimball, William Franklin,	Belchertown.
King, George Worthington,	Northampton.
Krasker, Abraham,	Boston.
Lane, George Henry,	Malden.
Laporte, Rudolph John,	Holyoke.
Lewis, Bert Morton,	Northampton.
Lewis, Edward Williams,	Amherst.
Long, John James,	South Hadley Falls.
Lucia, Charles Edward,	Westfield.
Lucier, George Robert,	Northampton.
Lyman, Earl Frederick,	South Hadley.
Lyman, Paul Edward,[1]	South Amherst.
Markle, Clarence Howard,[1]	Norwood.
Mattoon, Max Watkins,	Pittsfield.
McCarthy, Frank Joseph,	Peabody.
Metcalf, Luther Ellsworth,	Enfield.
Mitchell, Edmund Babcock,	Easthampton.
Moore, Charles Dwight,	Arlington.
Morrell, Roland,	East Deerfield.
Morse, Philip Bryant,	Athol.
Myers, Willis Arthur,	Hudson.
Newton, Earl Raymond,	Charlestown, N. H.
O'Brien, Michael Stephen,	Haydenville.
O'Connor, James Edward,	Holyoke.
Paige, Howard Lindsey,	Amherst.
Paine, Walter Erwin,	Ludlow.
Paine, Warren Dewey,	Ludlow.
Palmer, Ray,	Springfield.
Parks, Leroy Burton,	Suffield, Conn.
Patterson, Edward Stanley,	Walpole.
Perkins, George Elmer,	Westford.
Peterson, Raymond Nicanor,	Franklin.
Phillips, Alvin Henry, Jr.,	Longmeadow.
Polley, Dwight Earle,	Springfield, Vt.
Pratt, Theodore Cary,	Deerfield.
Pruzynski, Walter Peter,	Florence.
Purrington, Philip Morris,	Haydenville.

[1] Enrolled.

Reed, Frank Henry, Jr.,	Greenfield.
Reed, Samuel Jacob,	Worcester.
Reid, Howard Stanton,	Franklin.
Richardson, Ello Elwin,	Haverhill.
Richey, Clifford Elmer,	Willimansett.
Roberts, Stanley Byron,	Easthampton.
Robinson, Nathan Hale,	Braintree.
Rohan, James Patrick Joseph,	Holyoke.
Rollins, Walter Jessie,	Leominster.
Russell, Leonard Howland,[1]	Winthrop.
Smead, Perley Jesse,	Greenfield.
Smiley, Fred William,	Haydenville.
Smith, Albert William,	Easthampton.
Smith, Maxfield Merriam,	Pittsfield.
Stack, John Paul,	Conway.
Strong, John Robert,	Pittsfield.
Sturtevant, Kenneth Arms,	Greenfield.
Taylor, Clarence Leo,	Jamaica Plain.
Teagan, John Edward,	West Warren.
Tracy, Ralph Prior,	Winchendon.
Trulson, George Frederick,	Worcester.
VanWyck, Prescott,	Summit, N. J.
Wallin, George Bernard,	Easthampton.
Walsh, Jerome James,	Greenfield.
Walz, Edward Henry,	Easthampton.
Warnock, Raymond Albert,	South Hadley Falls.
Webber, Karl Durrell,	West Wrentham.
Weisner, Frederick Kenneth,	Meriden, Conn.
Welch, George Louis,	Holyoke.
Wells, Lyman Alfred,	Greenfield.
Wentsch, Harold Earle,	Southbury, Conn.
White, George Edwin,	Worcester.
White, Robert Lloyd,	Arlington.
Wickham, Virgil Ona,	Athol.
Wilder, Franklin Elijah,	Bernardston.
Wilkinson, Albert Fay,	South Hadley.
Williams, Charles Arthur,	Springfield.
Woodard, Roland Howard,	Leverett.
Wright, Whitcomb Wadleigh,	Lowell.

CLASS OF 1919, REGULAR.

Brigham, Sylvia Bowen,	Newtonville.
Buffum, Eliot Mansfield,	Waban.
Carroll, Olive Evangeline,	Dorchester.
Cosby, Alfred Francis,	Westfield.
Erhard, Bena Gertrude,	East Milton.
Faber, Edward Stuart,	Plainfield, N. J.
Ferriss, Samuel Boynton,	New Milford, Conn.
Field, Wilbert Daniel,	Winter Hill.
Garvey, Mary Ellen Monica,	Amherst.
Guba, Emil Frederick,	New Bedford.
Harris, Ethel Lovett,	Beverly.
Hartwell, Richard Raymond,	Springfield.
Hastings, Louis Pease,	Springfield.
Hodgson, Benjamin Earl,	Methuen.
Howe, Ralph Thomas,	Melrose.
Knowlton, Priscilla,	Roxbury.
Liebman, Anna,	Dorchester.
Morton, Elmer Joshua,	Watertown.
Parkhurst, Raymond Thurston,	Fitchburg.
Peck, George Newberry,	Granville.

[1] Enrolled.

Peirson, Henry Byron,	New Bedford.
Pulley, Marion Gertrude,	Melrose.
Rea, Julian Stuart,	East Weymouth.
Sibley, Helen Aramintha,	Wollaston.
Stevens, Chester Dillingham,	Reading.
Thomas, Frank DesAutels,	Milford.
Vickers, John,	Amherst.
Wells, Marion Nichols,	Springfield.
Williams, Kenneth Sanderson,	Sunderland.
Wood, Oliver Wiswall,	Arlington.
Woodbury, Ray Willard,	Portsmouth, N. H.
Yesair, John,	Byfield.

Class of 1920, Regular.

Bailey, William, Jr.,	Williamstown.
Belcher, Daniel Webster,	North Easton.
Berman, Harry,	Holyoke.
Boardman, Charles Meade,	Amherst.
Campbell, George Murray,	Baltimore, Md.
Earley, Marion Edith,	West Newton.
Harvey, Ebenezer Erskine,	Washington, D. C.
Hill, John Farren,	Egypt.
Hurd, Davis Alden,	Wellesley Hills.
Mather, Fred,	Amherst.
McNulty, Raymond Henry,	Amherst.
Millard, Helen Stanley,	Great Barrington.
Myers, Ralph Ernest,	Hudson.
Reed, Morris,	Worcester.
Smith, Donald Hiram,	Pittsfield.
Smith, George Alfred,	Whitinsville.
Smith, Susan Almira,	Great Barrington.

Class of 1921, Regular.

Blackwell, Henrietta,	Boston.
Cameron, Viola Mary,	Amherst.
Dixon, Harry Louis,	Harrisville, R. I.
Goodstone, Sarah Winthrop,	Springfield.
Leavitt, Ralph Goodwin,	Melrose.
Lovering, Rolland Frederick,	Northampton.
Richardson, Marjory,	Millis.
Robertson, Lafayette Janes, Jr.,	Hartford, Conn.
Russell, Charles Francis,	Winchendon.
Russert, Marion Ruth,	Roxbury.
Tillson, Reginald Drury,	Whitman.
VanLennep, Emily Bird,	Great Barrington.
West, Guy Clifford,	Amesbury.

Class of 1922, Regular.

Barnard, Kenneth Allen,	Shelburne.
Blakely, Roger Wolcott,	Medford.
Blanchard, Raymond Stanwood,	Wollaston.
Brason, Albert Grover,	Worcester.
Chandler, Georgine Alma,	Amherst.
Chase, Eleanor Frances,	Amesbury.
Cheng, Pu-Ching,	Panchow, Foochow, China.
Clark, Clarence Frederick,	Sunderland.
Cook, Frederick Belcher,	Middlebury, Conn.
Cotton, George Asa,	Woburn.
Degener, Otto,	New York, N. Y.
Farwell, Charles Austin,	Turners Falls.
Feng, Chao Chuan,	Ho-joh, Kiangsu, China.
Field, Richard Edmund,	Shelburne Falls.
Fine, Harold,	New York, N. Y.

Gordon, Howard Reynolds,	Ipswich.
Gussman, Ralph,	Roxbury.
Haskins, Philip Hall,	North Amherst.
Holman, Reginald Newton,	Somerville.
Hurder, Ruth Wasson,	Mattapan.
Hussey, Francis William,	Whitinsville.
Leland, James Freeman, Jr.,	Sherborn.
Lovering, Everett Waldron,	Northampton.
Main, Stuart DeGroff,	Maplewood, N. J.
McGuinn, Albert Francis,	Worcester,
Millard, Norman Lafayette,	North Adams.
Murdock, Matthew John,	Medford.
Packer, George Blanchard,	Waterbury, Conn.
Pollard, Jane Isabel,	North Adams.
Shaw, Beryl May Simpson,	Amherst.
Sherman, Kenneth David,	Orange.
Smith, Rowland Piper,	North Amherst.
Stange, Nils Walter,	Orange.
Walker, Philip Duane,	Hardwick.
Warren, Edwin Herbert,	Chelmsford.

UNCLASSIFIED.

Bowen, Maurice Stetson,	Middleborough.
Collins, Donald Keith,	Rockland.
Gustin, Francis Borden,	North Amherst.
Kimball, Hazen Bixby,	Rehoboth.
Kimball, William Howard,	Rehoboth.
King, Harry Walter,	East Longmeadow.
Knapp, Fanny Carter,	Lowell.
Marcou, Louis,	Chelsea.
McKenzie, David Hamilton,	Thorndike.
Noble, Theodore Kingsbury,	New London, Conn.
Novitski, Joseph Francis,	Amherst.
Prouty, Alfred Howe,	Spencer.
Spring, Hobart Wadsworth,	Braintree.
Wendler, Henry George,	Clinton.
Whitney, Clara Frances,	Boston.
Williamson, Mary,	Washington, D. C.

VOCATIONAL POULTRY COURSE.

Ivens, Reginald,	Brooklyn, N. Y.
Ivens, Mrs. Reginald,	Brooklyn, N. Y.
O'Kane, Ellen,	Bridgeport, Conn.

SUMMARY BY CLASSES.

Class.	S. A. T. C.	Enrolled in S. A. T. C.	Regular.		Total.
			Men.	Women.	
Graduate students,	–	–	7	3	10
1919,	19	1	22	10	52
1920,	46	1	14	3	64
1921,	64	2	7	6	79
1922,	75	4	30	5	114
Special,	147	4	–	–	151
Unclassified,	–	–	13	3	16
Vocational Poultry,	–	–	1	2	3
	351	12	94	32	489

Second Term Registration, 1918-19.

Graduate Students.

Bailey, Esther, ... Arlington.
A.B., Wellesley College.
English, Harriet Holt, ... New Haven, Conn.
A.B., Vassar College.
Jones, Linus H., ... Milford.
B.Sc., Massachusetts Agricultural College.
Julian, Arthur B., ... Amherst.
A.B., Northwestern University.
Mallorey, Arthur S., ... Lynn.
B.Sc., Massachusetts Agricultural College.
Morgan, Ezra Leon, ... Amherst.
A.B., McKendree College; M.A., University of Wisconsin.
Mutkekar, Satwaji Gundoji, ... Belgaum, India.
B.Agr., Poona Agricultural College.
M.Sc., Massachusetts Agricultural College.
Neill, James, ... Clarion, Pa.
B.S., Alleghany College.
Olcott, Mason, ... New York City.
A.B., Princeton University.
Prince, Arthur L., ... Webster.
A.B., Clark College.
Spofford, Chester P., ... Amherst.
B.Sc., Massachusetts Agricultural College.
Wheeler, Mrs. Mae, ... Amherst.
B.Sc., Massachusetts Agricultural College.

Class of 1919 (Seniors).

Bagg, Quincy Austin,[1]	South Hadley,	85 Pleasant Street.
Blanchard, Carlton Douglas,[1]	Uxbridge,	Kappa Sigma House.
Bond, Herbert Richard,	Needham,	Phi Sigma Kappa House.
Brigham, Sylvia Bowen,	Newtonville,	Draper Hall.
Buffum, Eliot Mansfield,[1]	Waban,	Q. T. V. House.
Burt, Henry John,	Arlington,	North College.
Callanan, Vincent DePaul,	Malden,	11 South College.
Carpenter, Hall Bryant,[1]	Somerville,	Kappa Sigma House.
Carroll, Olive Evangeline,	Dorchester,	33 East Pleasant Street.
Cassidy, Morton Harding,[1]	East Boston,	82 Pleasant Street.
Chambers, Roger James,[1]	Dorchester,	85 Pleasant Street.
Chandler, Arthur Lincoln,	Leominster,	12 South College.
Chisholm, Robert Dudley,	Melrose Highlands,	Phi Sigma Kappa House.
Collins, Robert Burleigh,	Rockland,	Theta Chi House.
Cosby, Alfred Francis,	Westfield,	15 Amity Street.
Davis, Albert Noah,	Somers, Conn.,	73 Pleasant Street.
Dickinson, Victor Abel,[1]	Amherst,	Mount Pleasant.
Erhard, Bena Gertrude,	East Milton,	Draper Hall.
Erickson, George Edwin,	Brockton,	North College.
Erickson, Gunnar Emmanuel,	West Lynn,	North College.
Evans, Myrton Files,	West Somerville,	96 Pleasant Street.

[1] Work incomplete.

Faber, Edward Stuart,	New York, N. Y.,	86 Pleasant Street.
Faneuf, Ambrose Clement,	West Warren,	7 South College.
Faxon, Paul,	Wellesley Hills,	Phi Sigma Kappa House.
Ferriss, Samuel Boynton,	New Milford, Conn.,	90 Pleasant Street.
Field, Wilbert Daniel,	Winter Hill,	Colonial Inn.
Fogg, Verne Allen,	Danvers,	6 South College.
French, Willard Kyte,	Worcester,	Q. T. V. House.
Garde, Earl Augustus,	Lynn,	30 North Prospect Street.
Garvey, Mary Ellen Monica,	Amherst,	27 South Prospect Street.
Gasser, Thomas Jefferson,	Uxbridge,	Alpha Sigma Phi House.
Guba, Emil Frederick,	New Bedford,	Clark Hall.
Harris, Ethel Lovett,	Beverly,	Draper Hall.
Hartwell, Richard Raymond,[1]	Springfield,	101 Pleasant Street.
Hastings, Louis Pease,	Springfield,	Kappa Sigma House.
Hodgson, Benjamin Earle,	Methuen,	Entomology Building.
Howe, Ralph Thomas,	Melrose,	101 Pleasant Street.
Huntoon, Douglas Henderson,	Norwood,	Phi Sigma Kappa House.
Jewell, Charles Henry,	Merrimac,	North College.
Johnson, Lawrence Wilhelm,[1]	Avon,	Alpha Sigma Phi House.
Johnson, Sidney Clarence,	Gloucester,	Alpha Gamma Rho House.
Knowlton, Priscilla,	Roxbury,	Draper Hall.
Liebman, Anna,	Dorchester,	Draper Hall.
Mather, William,	Amherst,	West Experiment Station.
Mattoon, Charles Gordon,	Pittsfield,	12 South College.
McCarthy, Arthur Martin,	Monson,	Q. T. V. House.
McKee, William Henry,[1]	Pittsfield,	Theta Chi House.
Parke, Robert Warren,	Winchendon,	6 Nutting Avenue.
Parkhurst, Raymond Thurston,	Fitchburg,	Kappa Sigma House.
Peck, George Newberry,	Granville,	North College.
Peirson, Henry Byron,	New Bedford,	Kappa Sigma House.
Phipps, Clarence Ritchie,[1]	Dorchester,	86 Pleasant Street.
Pulley, Marion Gertrude,	Melrose,	2 Allen Street.
Rea, Julian Stuart,[1]	East Weymouth,	North College.
Roberts, Oliver Cousens,	Arlington,	86 Pleasant Street.
Sibley, Helen Aramintha,[1]	Wollaston,	Draper Hall.
Smith, Wendell Frederick,	Pittsfield,	North College.
Spaulding, Harold Edwin,[1]	Milford,	Kappa Sigma House.
Stafford, Irving Boynton,	Fall River,	6 Nutting Avenue.
Stevens, Chester Dillingham,	Reading,	7 South College.
Stockwell, Ervin Sidney, Jr.,	Sharon,	North College.
Strack, Edward,[1]	Framingham,	Clark Hall.
Sutherland, Ralph,[1]	Cambridge,	85 Pleasant Street.
Sweeney, William Joseph,	Dorchester,	101 Pleasant Street.
Thomas, Frank DesAutels,	Milford,	1 South College.
Thompson, Wells Nash,	Adams,	Alpha Sigma Phi House.
Vickers, John[1]	Amherst,	1 South College.
Wells, Marion Nichols,	Springfield,	Draper Hall.
White, Edward Asa,[1]	Providence, R. I.,	12 South College.
Williams, Kenneth Sanderson,[1]	Sunderland,	Q. T. V. House.
Willoughby, Raymond Royce,	New Britain, Conn.,	North College.
Wood, Oliver Wiswall,	Arlington,	5 South College.
Woodard, Chester Smith[1]	Leverett,	32 Amity Street.
Yesair, John,	Newburyport,	Draper Hall.

CLASS OF 1920 (JUNIORS).

Apsey, George Wills, Jr.,[1]	Winchester,	85 Pleasant Street.
Bacon, Milo Roderick,	Leominster,	Draper Hall.
Ball, Harry Abraham,	Bridgewater,	Chemistry Building.
Ball, Lorin Earl,[1]	Amherst,	Q. T. V. House.
Beauregard, Winfield Scott,	Framingham,	15 South College.
Belcher, Daniel Webster,[1]	North Easton,	120 Pleasant Street.

[1] Work incomplete.

Berman, Harry,	Holyoke,	West Experiment Station.
Blanchard, Kenneth,[1]	Highland Falls, N. Y.,	Theta Chi House.
Boardman, Charles Meade,[1]	Amherst,	Q. T. V. House.
Brown, Roy Robertson,	Hudson,	Theta Chi House.
Burns, Allan Melville, Jr.,	Taunton,	Theta Chi House.
Campbell, George Murray,[1]	Baltimore, Md.,	Phi Sigma Kappa House.
Card, Ralph Hunter,	Somerville,	35 East Pleasant Street.
Carleton, John Foxcroft,	East Sandwich,	Draper Hall.
Center, Arthur Edwin,[1]	Springfield,	8 South College.
Chase, Malcolm Willis,[1]	Amesbury,	6 South College.
Clarridge, Fred William,[1]	Milford,	Theta Chi House.
Clough, Alfred Arnold,	Wollaston,	86 Pleasant Street.
Cole, Frederick Eugene, Jr.,	South Portland, Me.,	86 Pleasant Street.
Crafts, Gordon Burnham,[1]	Manchester,	Q. T. V. House.
Crawford, John Alexander,	Boston,	Alpha Gamma Rho House.
Daggett, Clinton Jones,	Albany, N. Y.,	Kappa Sigma House.
Delahunt, John Kersey,	Boston,	10 South College.
Derick, Glendon Robert,[1]	Clinton,	13 Fearing Street.
Dewing, Warren Montague,	Kingston,	Kappa Sigma House.
Doucette, Charles Felix,	Melrose,	North College.
Dunn, Arthur Paul,[1]	Malden,	90 Pleasant Street.
Earley, Marion Edith,[1]	West Newton,	Draper Hall.
Emery, Herbert Martin,[1]	Newburyport,	7 North College.
Graff, Leland Sprague,	Reading,	Q. T. V. House.
Graves, Carlisle Ferrin,	Stamford, Conn.,	85 Pleasant Street.
Hale, Frank Thompson Caldwell,[1]	Byfield,	90 Pleasant Street.
Hamlin, Hazen Wolcott,[1]	Amherst,	North Amherst.
Harrington, Harold Leon,	Lunenburg,	90 Pleasant Street.
Harvey, Ebenezer Erskine,[1]	Washington, D. C.,	Draper Hall.
Hill, John Farren,	Egypt,	5 South College.
Holloway, John William,	Taunton,	86 Pleasant Street.
Horne, Robert Sanderson,	Wellesley Farms,	Q. T. V. House.
Howe, Albert Edward,	Needham,	14 South College.
Jakeman, Brooks Franklin,[1]	Winchester,	82 Pleasant Street.
Littlefield, John Edwin,	West Lynn,	11 North College.
Lothrop, Earle Daniel,	West Bridgewater,	90 Pleasant Street.
Luce, William Alan,	West Boylston,	82 Pleasant Street.
Lyons, Henry Egmont,[1]	Boston,	East Experiment Station.
MacLeod, Guy Franklin,	Lowell,	Alpha Sigma Phi House.
Maples, James Comly,	Port Chester, N. Y.,	Kappa Sigma House.
Mather, Fred,	Amherst,	Veterinary Laboratory.
Meserve, Albert Wadsworth,	Framingham,	9 South College.
Millard, Helen Stanley,[1]	Great Barrington,	Draper Hall.
Oppe, Herman DeWitt,[1]	Coscob, Conn.,	10 South College.
Peckham, William Harold,[1]	Newport, R. I.,	Alpha Sigma Phi House.
Pike, Chester Arthur,[1]	Springfield,	82 Pleasant Street.
Quadland, Howard Preston,[1]	North Adams,	85 Pleasant Street.
Readio, Philip Adna,[1]	Florence,	90 Pleasant Street.
Redding, George Kenneth,	Melrose,	9 Fearing Street.
Roberts, Mark Anthony,[1]	Boston,	83 Pleasant Street.
Robertson, William Fenton,[1]	Framingham,	108 Pleasant Street.
Sanborn, Joseph Raymond,[1]	North Amherst,	North Amherst.
Sanderson, Ralph Hemenway,	Waltham,	South College.
Scott, Clifton William,	Buckland,	90 Pleasant Street.
Simmons, Lester Winslow,	Dighton,	86 Pleasant Street.
Smith, George Alfred,	Whitinsville,	Q. T. V. House.
Smith, Raymond Newton,[1]	Plainville,	Theta Chi House.
Smith, Susan Almira,[1]	Great Barrington,	Draper Hall.
Stedman, Ralph Shaw,	Springfield,	Phi Sigma Kappa House.
Sullivan, Walter Mitchell,[1]	Lawrence,	85 Pleasant Street.
Taylor, Elliot Hubbard,	Shelburne,	Q. T. V. House.
Taylor, Thornton Greenwood,[1]	Ipswich,	82 Pleasant Street.

[1] Work incomplete.

Urquhart, John Wardrop,	East Walpole,	8 South College.
Williams, Allan Carruth, [1]	Rockland,	11 North College.
Woodward, George Blossom, [1]	Albany, N. Y.,	9 Phillips Street.
Wright, Stuart Eldridge,	Raynham,	Kappa Sigma House.

CLASS OF 1921 (SOPHOMORES).

Alger, James Warren, [1]	Reading,	Kappa Sigma House.
Allen, Henry Vaughn,	Arlington,	Phi Sigma Kappa House.
Andersen, Charles Henry, [1]	Medford,	Theta Chi House.
Baker, Louis Eliot,	Salem,	16 South College.
Baker, Russell Dexter, [1]	Oxford, Me.,	17 Fearing Street.
Blackwell, Henrietta, [1]	Boston,	Draper Hall.
Brigham, John Dexter, [1]	Sutton,	82 Pleasant Street.
Brown, Paul Wilfred,	Fiskdale,	82 Pleasant Street.
Calhoun, Saltean Frederick,	Brookline,	10 South College.
Cameron, Viola Mary, [1]	Amherst,	East Pleasant Street.
Coombs, Roger Conklin,	Peabody,	11 South College.
Cooper, Lawrence Melville, [1]	Amherst,	90 Pleasant Street.
Dean, Herman Nelson, [1]	Oakham,	Q. T. V. House.
Dixon, Harry Louis, [1]	West Somerville,	Lambda Chi Alpha House.
Douglass, Donald Churchill, [1]	Cambridge,	Phi Sigma Kappa House.
Edman, George William, [1]	Orange,	Q. T. V. House.
Evers, Joseph Daniel,	Malden,	11 South College.
Feng, Chao Chuan,	Ho-joh, Kiangsu, China,	21 Fearing Street.
Fletcher, Francis Summers, [1]	East Lynn,	90 Pleasant Street.
Gaskill, Harland Everett, [1]	Hopedale,	care of E. F. Gaskill.
Geer, Herbert Leroy, [1]	Three Rivers,	Q. T. V. House.
Goodstone, Sarah Winthrop, [1]	Springfield,	81 Pleasant Street.
Gould, Robert Meredith,	Shelburne,	Q. T. V. House.
Haskins, Harold Arthur, [1]	North Amherst,	North Amherst.
Howard, Frederic,	Needham,	82 Pleasant Street.
Howard, Winthrop Wilmarth, [1]	South Easton,	120 Pleasant Street.
Iorio, Carlo Antonio,	Springfield,	East Experiment Station.
Johnson, Conrad John,	Campello,	82 Pleasant Street.
Kendall, Charles Donald,	Worcester,	Q. T. V. House.
King, Starr Margetts, [1]	Pittsfield,	Kappa Sigma House.
Kirkland, Lyle Lord, [1]	Chester,	9 South College.
Labrovitz, Edward Browdy,	Amherst,	11 Amity Street.
Leavitt, Ralph Goodwin, [1]	Melrose Highlands,	Theta Chi House.
Levine, Maurice Eleazer, [1]	Sherborn,	11½ Amity Street.
Lockwood, George Russell,	Hyde Park,	86 Pleasant Street.
Long, Albert Douglas, [1]	Chicopee,	14 South College.
Lovering, Rolland Frederick, [1]	Northampton,	283 Prospect Street.
Mackintosh, Charles Gideon,	Peabody,	Phi Sigma Kappa House.
Marsh, Walter Ashton, [1]	Jefferson,	90 Pleasant Street.
Martin, Edward William, [1]	Amherst,	5 Phillips Street.
McCarthy, Justin Jeremiah,	Arlington,	Phi Sigma Kappa House.
Mellen, Richard Adams,	Cambridge,	75 Pleasant Street.
Miller, William Henry,	Springfield,	7 Nutting Avenue.
Millington, Walter Roy, [1]	Maynard,	French Hall.
Palmer, Walter Isaiah, [1]	Amherst,	4 Chestnut Street.
Park, Francis Edwin, Jr., [1]	Stoneham,	Alpha Sigma Phi House.
Peck, Richard Charles,	Shelburne,	90 Pleasant Street.
Pratt, Lawrence Francis,	North Weymouth,	Q. T. V. House.
Preston, Everett Carroll, [1]	Dorchester,	East Experiment Station.
Quint, Isador Gabriel, [1]	Roxbury,	16 South College.
Rice, Henry Lawrence,	Somerville,	Kappa Sigma House.
Richards, George Henry,	Springfield,	Phi Sigma Kappa House.
Robertson, Lafayette Janes, Jr., [1]	Hartford, Conn.,	7 North College.
Robinson, Philip Luther, [1]	New Bedford,	90 Pleasant Street.
Rosoff, Samuel Nathaniel, [1]	Springfield,	16 South College.

[1] Work incomplete.

Russell, Charles Francis,[1]	Winchendon,	17 Fearing Street.
Russert, Marion Ruth,[1]	Roxbury,	Draper Hall.
Sampson, Howard Jenney,[1]	Fall River,	Theta Chi House.
Sanford, Richard Herbert,	Westfield,	14 South College.
Slate, George Lewis,[1]	Bernardston,	90 Pleasant Street.
Sloan, Kenneth Wilson,[1]	Amherst,	29 North Prospect Street.
Smith, Julian Denton,	Far Rockaway, N. Y.,	Lambda Chi Alpha House.
Snow, John Dow,[1]	Arlington,	Phi Sigma Kappa House.
Spencer, Orville Holland,[1]	West Haven, Conn.,	Phi Sigma Kappa House.
Starkey, Robert Lyman,	Fitchburg,	Phi Sigma Kappa House.
Stevens, Ralph Shattuck,[1]	Arlington,	Theta Chi House.
Stiles, Harry Stephen,[1]	Lynn,	9 South College.
Thyberg, George Jonathan,	Springfield,	Phi Sigma Kappa House.
Tietz, Harrison Morton,	Richmond Hill, N. Y.,	35 East Pleasant Street.
Tillson, Reginald Drury,	Whitman,	21 Fearing Street.
VanLennep, Emily Bird,	Great Barrington,	Draper Hall.
Webster, Milton Fuller,[1]	Malden,	73 Pleasant Street.
West, Guy Clifford,	Amesbury,	9 South College.
Wood, Clarence Milton,[1]	West Somerville,	82 Pleasant Street.
Zercher, Frederick Kaupp,	Huntington, W. Va.,	Q. T. V. House.

CLASS OF 1922 (FRESHMEN).

Acheson, Roger Melvin,	New Bedford,	53 Lincoln Avenue.
Bainton, Hubert Judson,	Hyde Park,	75 Pleasant Street.
Baker, George Louis,	Amherst,	West Street.
Barnard, Kenneth Allen,	Shelburne,	Aggie Inn.
Barnes, Franklin Allen,[1]	West Lynn,	66 Pleasant Street.
Barrows, Edward Fletcher,	Brattleboro, Vt.,	75 Pleasant Street.
Beckwith, Robert Henry,[1]	Worcester,	3 Nutting Avenue.
Bent, Leslie Dana,	Medfield,	83 Pleasant Street.
Blakely, Roger Wolcott,	Medford,	66 Pleasant Street.
Blanchard, Raymond Stanwood,[1]	Wollaston,	Stockbridge Hall.
Brason, Albert Grover,[1]	Worcester,	Stockbridge Hall.
Bromley, Stanley Willard,	Southbridge,	75 Pleasant Street.
Buck, Charles Alfred,	Mansfield,	35 East Pleasant Street.
Burnham, Edwin Graham,[1]	Springfield,	The Davenport.
Carey, Edmund Thomas,	Springfield,	83 Pleasant Street.
Chapin, Ellis Warren,[1]	Chicopee Falls,	35 East Pleasant Street.
Chase, Eleanor Frances,	Amesbury,	Draper Hall.
Clark, Clarence Frederick,	Sunderland,	Q. T. V. House.
Coles, Howard Finlay,	Tarrytown, N. Y.,	11 North College.
Collins, Donald Keith,[1]	Rockland,	101 Pleasant Street.
Collins, Herbert Laurence,[1]	Arlington,	101 Pleasant Street.
Cook, Frederick Belcher,	Middlebury, Conn.,	101 Butterfield Terrace.
Cotton, George Asa,[1]	Woburn,	84 Pleasant Street.
Crichton, Peter Andrew,	Greenwich, Conn.,	3 North College.
Cross, Charles Sale,[1]	Hingham Center,	53 Lincoln Avenue.
Cummings, Robert,[1]	Newton,	6 Nutting Avenue.
Davis, Harold Sanborn,	Belchertown,	17 Fearing Street.
Degener, Otto,[1]	New York, N. Y.,	81 Pleasant Street.
DuBois, Howard Grace,[1]	Springfield,	23 East Pleasant Street.
Eldridge, Dean Stratton,	Amherst,	8 Gaylord Street.
Erysian, Harry Adrian,[1]	Chelsea,	North College.
Farwell, Charles Austin,[1]	Turners Falls,	116 Pleasant Street.
Fenton, James Francis,	Amherst,	108 Pleasant Street.
Field, Richard Edmund,	Shelburne Falls,	East Experiment Station.
Frilen, Karl Arvid,[1]	West Springfield,	53 Lincoln Avenue.
Gaskill, Millard Thayer,	Hopedale,	care of E. F. Gaskill.
Gilbert, Frank Albert, Jr.,[1]	Watertown,	Plant House.
Giles, Clifton Forrest,	Newtonville,	6 Nutting Avenue.
Gowdy, Carlyle Hale,	Westfield,	15 Amity Street.

[1] Work incomplete.

Graves, James Addison,[1]	Shelburne Falls,	31 East Pleasant Street.
Haskins, Philip Hall,[1]	North Amherst,	North Amherst.
Higgin, Albert Snyder,[1]	Passaic, N. J.,	83 Pleasant Street.
Holman, Reginald Newton,	Somerville,	101 Pleasant Street.
Hooper, Francis Edwards,	Revere,	23 East Pleasant Street.
Hooper, Oliver Furbish,[1]	East Lynn,	6 Prospect Street.
Hurder, Ruth Wasson,[1]	Mattapan,	81 Pleasant Street.
Hussey, Francis William,	Whitinsville,	7 Nutting Avenue.
Jackson, Belding Francis,	Belchertown,	Fearing Street.
Jarvis, Albert Arthur,	Lynn,	3 North College.
Jarvis, Harold Nelson,[1]	Lynn,	83 Pleasant Street.
Lawrence, Robert Parker,	East Greenwich, R. I.,	Mathematics Building.
Lawton, Harold Hayden,[1]	Bradford,	Poultry Plant.
Leland, James Freeman, Jr.,[1]	Sherborn,	13 Phillips Street.
Leonard, Earle Stanley,[1]	Hyde Park,	16 Nutting Avenue.
Lewandowski, John Neptumcen,[1]	Easthampton,	77 Pleasant Street.
Lingham, Robert Marston,[1]	Newton Highlands,	Q. T. V. House.
Lockhart, John Harold,	Tarrytown, N. Y.,	Plant House.
Lovering, Everett Waldron,	Northampton,	283 Prospect Street.
Lowery, John Gordon,[1]	Malden,	80 Pleasant Street.
Lyons, Edgar Albion,	Methuen,	101 Pleasant Street.
Lyons, John Joseph, Jr.,	Arlington,	101 Pleasant Street.
MacArdle, Herbert Aloysius,[1]	Worcester,	5 South College.
Main, Stuart DeGroff,	Maplewood, N. J.,	101 Butterfield Terrace.
McGuinn, Albert Francis,	Worcester,	83 Pleasant Street.
Moody, Kenneth Watts,	Brookline,	16 Nutting Avenue.
Morgan, Stuart Carleton,[1]	Worcester,	53 Lincoln Avenue.
Moseley, Henry Samson,	Glastonbury, Conn.,	66 Pleasant Street.
Murdock, Matthew John,	Medford,	Aggie Inn.
Murray, Myron George,	Bradford,	75 Pleasant Street.
Packer, George Blanchard,[1]	Waterbury, Conn.,	77 Pleasant Street.
Peck, William Henry,	Stow,	75 Pleasant Street.
Pickup, Ezra Alden,[1]	Holyoke,	4 North College.
Pollard, Jane Isabel,[1]	North Adams,	Draper Hall.
Roser, Conrad Herman,	Glastonbury, Conn.,	66 Pleasant Street.
Russell, Ralph,	Worcester,	51 Amity Street.
Shaw, Beryl May Simpson,	Amherst,	Farview Way.
Sherman, Kenneth David,[1]	Orange,	35 East Pleasant Street.
Smith, Rowland Piper,[1]	North Amherst,	46 Pleasant Street.
Smith, Stuart VanAlstyne,	Springfield,	23 East Pleasant Street.
Spadea, James Vincent,	Brockton,	4 North College.
Spring, Hobart Wadsworth,	Braintree,	77 Pleasant Street.
Stephan, Henry Wesley,	Jamaica Plain,	1 North College.
Stevens, Albert Webster,	Arlington Heights,	5 Nutting Avenue.
Stevens, Seth Edward,	Reading,	7 South College.
Stubing, Ernest Stone,[1]	New York, N. Y.,	66 Pleasant Street.
Sullivan, Joseph Timothy,	Lawrence,	53 Lincoln Avenue.
Swift, Arthur Lawrence,	North Amherst,	Summer Street.
Tanner, Willis,[1]	Yokohama, Japan,	3 McClure Street.
Task, Mortimer,	West Stoughton,	3 Nutting Avenue.
Thompson, George Henry, Jr.,[1]	Lenox,	84 Pleasant Street.
Tucker, Francis Sample,	Arlington,	4 Nutting Avenue.
VanAnden, Luther Charles,[1]	Carmel, N. Y.,	53 Lincoln Avenue.
Walker, Philip Duane,[1]	Hardwick,	116 Pleasant Street.
Walsh, John Leonard,[1]	Amherst,	4 Chestnut Street.
Warren, Edwin Herbert,	Chelmsford,	82 Pleasant Street.
Wason, Raymond,	Brookline,	11 North College.
Whitaker, Carl Fales,[1]	Hadley,	Hadley.

[1] Work incomplete.

PROVISIONAL FRESHMEN.[1]

Ames, Nathaniel Jackson,	Peabody,	Kappa Sigma House.
Andrews, John Hollis,	Vineyard Haven,	3 McClure Street.
Arms, Philip Baxter,	Hopkinton,	6 Nutting Avenue.
Arms, Richard Woodworth,	Hopkinton,	13 Phillips Street.
Conant, Luman Binney,	Waltham,	18 Nutting Avenue.
Eastwood, John Edgar,	Plymouth,	7 Nutting Avenue.
Fiske, David Allen,	Amherst,	Brooks Farm.
Globus, Joseph,	Attleboro,	8 North College.
Howard, Elmer Smith,	South Easton,	120 Pleasant Street.
Kemp, George Austin,	North Andover,	75 Pleasant Street.
Kenney, Chester Davis,	Amherst,	Mount Pleasant.
Krasker, Abraham,	Boston,	53 Lincoln Avenue.
Law, Hervey Fuller,	Longmeadow,	Experiment Station.
Lewis, Edward Williams,	Amherst,	19 Lincoln Avenue.
Nigro, Henry,	Revere,	120 Pleasant Street.
Paige, Howard Lindsey,	Amherst,	12 Kellogg Avenue.
Palmer, Ray,	Springfield,	6 South College.
Purington, George Richmond,	Providence, R. I.,	2 North College.
Randall, Kenneth Charles,	Springfield,	Experiment Station.
Rollins, Walter Jessie,	Leominster,	31 East Pleasant Street.
Smith, Albert William,	Easthampton,	77 Pleasant Street.
Smith, Maxfield Merriam,	Pittsfield,	23 East Pleasant Street.
Taylor, Clarence Leo,	Jamaica Plain,	31 East Pleasant Street.
Wentsch, Harold Earle,	Southbury, Conn.,	94 Pleasant Street.
White, George Edwin,	Worcester,	4 Chestnut Street.

UNCLASSIFIED STUDENTS.

Anderson, Gust William,	Brockton,	9 Fearing Street.
Beverly, Ralph Gardner,	Springfield,	16 Nutting Avenue.
Carlson, Walter Mauritz,	Northborough,	5 Fearing Street.
Connor, John Leo,	Northampton,	42 Day Avenue.
Crosby, Robert Francis,	Lawrence,	90 Pleasant Street.
Geoghegan, James Dewey,	Brighton,	Poultry Plant.
Gerrish, Arthur Herman,	Lowell,	66 Pleasant Street.
Gustin, Francis Borden,	North Amherst,	North Amherst.
Harrington, Frederic, Jr.,	Winchester,	83 Pleasant Street.
Hart, Owen Stephen,	Meriden, Conn.,	6 Nutting Avenue.
Hugo, Alvin Ernest,	Worcester,	3 Fearing Street.
Jones, Ashley Sumner,	Lynn,	7 Nutting Avenue.
Jones, Edward Charles,	Wrentham,	34 North Prospect Street.
Kimball, Hazen Bixby,	Rehoboth,	M. A. C. Bungalow.
Kimball, William Howard,	Rehoboth,	M. A. C. Bungalow.
Knapp, Fanny Carter,	Lowell,	Draper Hall.
McKenzie, David Hamilton,	Thorndike,	Physics Building.
Noble, Theodore Kingsbury,	New London, Conn.,	The Davenport.
Novitski, Joseph Francis,	Amherst,	6 Phillips Street.
Prouty, Alfred Howe,	Spencer,	Q. T. V. House.
Reynolds, Frank Curtis,	Hadley,	Kappa Sigma House.
Stockbridge, Derry Lamar,	Atlanta, Ga.,	Kappa Sigma House.
Tracy, Ralph Prior,	Winchendon,	3 Fearing Street.
Trulson, George Frederick,	Worcester,	5 Fearing Street.
Webber, Karl Durrell,	West Wrentham,	103 Butterfield Terrace.
Wendler, Henry George,	Clinton,	Stockbridge Hall.
Whitney, Clara Frances,	Boston,	Draper Hall.
Williamson, Mary,	Washington, D. C.,	Draper Hall.
Wright, Whitcomb Wadleigh,	Lowell,	90 Pleasant Street.

[1] Admitted from Special S. A. T. C., or from service of army or navy.

GEOGRAPHICAL SUMMARY.

Massachusetts,	337
Connecticut,	16
New York,	13
Rhode Island,	4
Maine,	2
New Jersey,	2
District of Columbia,	2
Georgia,	1
Maryland,	1
Pennsylvania,	1
Vermont,	1
West Virginia,	1
China,	1
India,	1
Japan,	1
Total,	384

ENTERED COLLEGE AFTER CATALOGUE LISTS WERE MADE FOR 1917–18.

Unclassified Students.

Denowitz, Solomon,[1]	Springfield.
May, Eleanor Kent,[2]	Jamaica Plain.
Reed, Frank Henry, Jr.,[2]	Greenfield.

SUMMARY BY CLASSES.[3]

CLASS.	Men.	Women.	Total.
Graduate students,	9	3	12
Senior class, 1919,	64	10	74
Junior class, 1920,	69	3	72
Sophomore class, 1921,	70	5	75
Freshman class, 1922,	93	4	97
Provisional freshmen,	25	–	25
Unclassified students,	26	3	29
Total,	356	28	384

[1] Entered January, 1918.
[2] Entered March, 1918.
[3] Registration to date of Feb. 17, 1919.

Short Course Enrollment.

Ten Weeks' Course, 1918.

Amatt, Percival B.,	Northampton.
Antonovitch, Michael,	Brockton.
Baker, Howard W.,	Wollaston.
Barrett, Arthur W.,	Fitchburg.
Bates, Richard B.,	West Medford.
Bennett, Rosamond T.,	Auburndale.
Bianky, Peter P.,	Hoosick Falls, N. Y.
Bieloy, Michael,	Rock Island, Ill.
Blanchard, Warren E.,	Bedford.
Bowes, Louis M.,	South Amherst.
Brett, John E.,	Pittsfield.
Brien, Audry,	New York, N. Y.
Brown, Roland H.,	Hoosick, N. Y.
Bryant, Harold M.,	Dalton.
Burhoe, N. Putnam,	Ashland.
Callahan, Wm. A.,	Haverhill.
Cantelo, George W.,	Hoosick Falls, N. Y.
Capen, Frank H.,	Stoughton.
Clapp, Elmer E.,	Northampton.
Clapp, Philip J.,	Northampton.
Chayun, David,	Hoosick Falls, N. Y.
Chucheloff, George,	Hoosick Falls, N. Y.
Cleaver, C. Leroy,	Hingham Center.
Colburn, George A.,	New Boston, N. H.
Cox, Edgar,	Holyoke.
Cushing, Helen,	Norwell.
Cutler, Albert B.,	Boylston.
Dickinson, Bernice H.,	Granville.
Dickinson, Joseph L.,	Granville.
Elnitsky, Arthur,	New York, N. Y.
Flagg, Irving,	Littleton.
Fox, Archer D.,	Lowell.
Gay, George S.,	Belchertown.
Glowatzky, A.,	New York, N. Y.
Goodnow, Edna M.,	Amherst.
Gorkush, Dimity,	Rock Island, Ill.
Goss, A. Lincoln,	Waltham.
Grout, Herbert,	Hartland, Vt.
Hammond, Frank,	Groton.
Jackimkoff, Paul,	Hoosick Falls, N. Y.
Kalendruz, Savva,	New York, N. Y.
Kalinuk, Eugene K.,	Hartford, Conn.
Kilbourn, Walton G.,	South Lancaster.
King, Gertrude M.,	Nantucket.
Kostuchik, Gregory,	Rock Island, Ill.
Kneeland, Karl W.,	Amherst.
Lakin, Edwin G.,	East Milton.
Leibel, Charles,	Boston.
Lerner, George H.,	Colchester, Conn.
Matechun, Stanislaw,	Hoosick Falls, N. Y.

Migas, Ona M.,	South Boston.
Millard, D. A.,	Amherst.
Nazarchuk, Kondrat,	Hoosick Falls, N. Y.
Nazarchuk, Paul,	Hoosick Falls, N. Y.
Novikoff, John,	Detroit, Mich.
Northrup, Harold E.,	Williamstown.
Omeleek, A.,	New York, N. Y.
Peirson, William E.,	New Bedford.
Pelchik, Wasley,	Thomaston, Conn.
Piper, Walter E.,	Melrose.
Proskodsky, Vladimir,	Waterbury, Conn.
Putnam, F. H.,	Framingham.
Reed, Frank H., Jr.,	Greenfield.
Richards, Bertha C.,	Walpole.
Rossiter, J. Harold,	Guilford, Conn.
Smaglo, John,	– –
Salmon, Phillips C.,	Needham.
Samsonoff, Egor A.,	Hoosick Falls, N. Y.
Sawin, Paul B.,	Fitchburg.
Scott, Raymond E.,	Pepperell.
Scott, Stephen A.,	Pepperell.
Shevehuk, Michael,	Rock Island, Ill.
Smead, H. P.,	Wilbraham.
Spofford, Ralph O.,	Georgetown.
Stockbridge, John S.,	Atlanta, Ga.
Stone, Kenneth W.,	Ashby.
Tatro, Raoul E.,	Northampton.
Taylor, Jasper E.,	Chelsea, Vt.
Watson, Charles P.,	Springfield.
Wells, Anna M.,	Palmer.
Wheeler, Wilfred,	Concord.
White, Gertrude M.,	Andover, Conn.
Wilkins, Edward H.,	Springfield.
Wilkins, Mrs. E. H.,	Springfield.
Wood, John D.,	North Falmouth.
Walchuk, Alexis,	Waterbury, Conn.
Verbovsky, Joseph,	Philadelphia, Pa.
Yamkach, Michael,	Hoosick Falls, N. Y.
Yonko, Vasil,	Hoosick Falls, N. Y.
Zacharoff, A.,	Crumm Lyme, Pa.
Zuk, Dimiter,	Waterbury, Conn.

Summer School, 1918.

Andrews, Alice M.,	Boston.
Babbitt, Claire A.,	Northampton.
Baker, Mrs. Roy D.,	North Adams.
Barnes, Mrs. Elizabeth,	Boston.
Barnes, Robert D.,	Boston.
Bayley, Louise M.,	Peacham, Vt.
Bradley, Ruth J.,	Springfield.
Burt, Mildred L.,	Oakham.
Clark, Kathleen,	New York, N. Y.
Clark, Margaret,	New York, N. Y.
Clay, Stewart T.,	Quakertown, Pa.
Cook, Mrs. John H.,	Amherst.
Clifford, Catherine F.,	Roxbury.
Culbert, Hilda,	Roxbury.
Cunningham, Mary,	Hubbardston.
Darling, Mary H.,	Sunderland.
Davis, Bertha E.,	Brookline.
Doyle, Margaret L.,	Natick.
Drake, Beatrice E.,	North Middleborough.
Durland, Grace,	Wenham.

Fletcher, Florence A.,	Auburndale.
Frost, Mabelle S.,	Worcester.
Giblin, Dora M.,	Marlborough.
Gleason, Gertrude,	Newton Highlands.
Ginterman, Alexander M.,	St. Paul, Minn.
Gleason, Linnette G.,	Newton Highlands.
Graves, Lillian B.,	Sunderland.
Hall, Christine,	Northampton.
Hall, Mabel W.,	Cambridge.
Hodge, Josephine A.,	Amesbury.
Holt, Rosa B.,	New York, N. Y.
Hoxie, Elizabeth,	New Bedford.
Hubbard, Olive H.,	Amherst.
Hubley, Mrs. A. M.,	West Medford.
Hubley, Edna M.,	West Medford.
Hughes, Mrs. M. B.,	Wellesley.
Ivens, Reginald,	New York, N. Y.
Jefferson, Rose E.,	Montello.
Joyce, Helen M.,	Framingham.
Kelleher, Marion M.,	Framingham.
Kennedy, Kathleen A.,	Clifton.
Lee, Margaret,	Cohasset.
Liddell, Anna B.,	Boston.
Liehman, Ruth,	Amherst.
Macurdy, Louise B.,	Watertown.
McCahill, James R.,	Lake City, Minn.
Morris, Nathalie,	Chestnut Hill, Philadelphia, Pa.
Morse, Louise,	Spencer.
Morse, Myrtie E.,	Wellesley.
O'Brien, Mary A. J.,	Dorchester.
O'Bryan, Evelyn,	Boston.
Rice, Mrs. M. J.,	Adams.
Romans, Gertrude,	Boston.
Rosenfield, Jeanne H.,	Providence, R. I.
Runnels, Ida D.,	East Bridgewater.
Sanderson, A. Gertrude,	Waltham.
Scott, Florence,	Worcester.
Taylor, Mrs. C. G.,	Springfield.
Towne, Mary E.,	Brookline.
Townsend, S. A., Jr.,	Webster Groves, Mo.
Tuxbury, Grace M.,	Brockton.
Walker, Alta M.,	Lexington.
Walsh, Mrs. Bertha H.,	Amherst.
Warner, Fannie H.,	Sunderland.
Wheeler, Gertrude M.,	Baldwinsville.
White, Mrs. E. C.,	North Brookfield.
Whitney, W. H.,	West Springfield.
Wilson, Grace H.,	Amherst.

TWO-YEAR COURSE, 1918–19.

Anderson, Walter R.,	East Pepperell,	13 Phillips Street.
Bailey, Ruth M.,	Needham,	116 Pleasant Street.
Bartlett, John H., Jr.,	Nantucket,	Mount Pleasant.
Boal, William M.,	Boston,	15 Phillips Street.
Brady, Benjamin,	Greenfield,	Mount Pleasant.
Burns, Timothy F.,	Cambridge,	3 Nutting Avenue.
Burrington, Reginald,	North Amherst,	North Amherst.
Butts, Edith,	New York, N. Y.,	4 Nutting Avenue.
Clapp, Horace D.,	Easthampton,	8 Kellogg Avenue.
Clark, Elbridge T.,	Millis,	75 Pleasant Street.
Crane, Reginald,	New York, N. Y.,	16 Nutting Avenue.
Davis, Frederick O.,	Windsor, Vt.,	45 Pleasant Street.
Davis, Mary G.,	Weston,	120 Pleasant Street.

Day, Roland W.,	Medfield,	83 Pleasant Street.
Dibble, Benjamin F.,	East Haven, Conn.,	21 Fearing Street.
Fine, Samuel,	Attleboro,	8 North College.
Forbes, Rose R.,	Jamaica Plain,	North Amherst.
Frary, Frank T.,	Southampton,	8 Kellogg Avenue.
Gagnier, Christopher I.,	Springfield,	77 Pleasant Street.
Graves, Reginald S.,	Bridgeport, Conn.,	15 Phillips Street.
Gushee, Roger H.,	Ludlow,	75 Pleasant Street.
Hamilton, Sumner P.,	Bolton,	13 Phillips Street.
Hawes, Leon R.,	Sudbury,	35 East Pleasant Street.
Hill, Grace M.,	Amesbury,	44 Pleasant Street.
Hollingsworth, Leonard,	Siasconset,	120 Pleasant Street.
Kirchner, Robert W.,	Pittsfield,	Mount Pleasant.
Kramer, Israel,	Lynn,	16 Nutting Avenue.
Landstrom, Oscar N.,	Heath,	5 Nutting Avenue.
Porrovecchio, Carl J.,	Charlemont,	5 Nutting Avenue.
Power, John F.,	Millis,	75 Pleasant Street.
Prescott, Alice B.,	Jamaica Plain,	Draper Hall.
Prouty, Stanly B.,	Furnace,	7 Nutting Avenue.
Reid, Howard S.,	Franklin,	15 Phillips Street.
Rivera, Galo,	Caycy, Porto Rico,	The Davenport.
Rowe, Elliot E.,	Bolton,	13 Phillips Street.
Segelman, Max,	Chelsea,	9 Fearing Street.
VanDerpoel, Ernest C.,	Chicopee Falls,	35 East Pleasant Street.

TEN WEEKS' COURSE, 1919.

Baker, Roy D. (Mrs.),	Fitchburg.
Bishop, Arthur F.,	Guilford, Conn.
Bridgman, Henry P.,	Westhampton.
Buffington, Willard,	Ware.
Burgess, Mary W.,	Boston.
Burt, George H.,	Westhampton.
Cantelo, George W.,	Hoosick Falls, N. Y.
Carter, Ray A.,	Boston.
Clarke, Elizabeth Lawrence,	Williamstown.
Crothers, James Hall,	Kingston.
Davenport, Howard J.,	Bardwells.
DeLano, Robert M.,	Richmond Hill.
Evans, Augusta D.,	Canton.
Everson, Carroll W.,	Amherst.
Fay, Addison G.,	New York, N. Y.
Feuer, Samuel S.,	New York, N. Y.
Fogarty, Anna,	Three Rivers.
French, E. J.,	Windsor, Vt.
Gallagher, George James,	Orange.
Glanton, Louise P.,	Peterborough, N. H.
Glatzerman, Benjamin,	Leonard's Bridge, Conn.
Goodnow, Lewis Weston,	Greenfield.
Gustin, B. F. (Rev.),	North Amherst.
Hamilton, Grant E.,	Cyrus.
Hannigan, William E.,	Fitchburg.
Hargreaves, Stanley,	Leeds.
Hathaway, John C.,	Northampton.
Hayward, Ralph,	South Amherst.
Hoffmann, Eleanor,	St. Louis, Mo.
Howard, Rodney,	Westhampton.
Ivens, Reginald,	New York, N. Y.
Ivens, Reginald (Mrs.),	New York, N. Y.
Tancred, Jacob,	North Adams.
Jourdian, Chas. L.,	Leeds.
Kasperowitz, Anna,	New York, N. Y.
King, Gertrude M.,	Taunton.
King, Howland S.,	South Dartmouth.

Knowles, Frank,	Dorchester.
Lawson, Alma J. (Mrs.),	Brockton.
Loeffler, James D.,	Uphams Corner.
Lyman, Paul Edward,	Amherst.
Maynard, Carol,	Worcester.
MacRae, Agnes,	Wilmington, N. C.
Montague, Fay B.,	Northampton.
O'Kane, Ellen,	Bridgeport, Conn.
Olsen, Hilda,	Boston.
Parker, Mary J. H. (Mrs.),	Ipswich.
Parker, Robert B., Jr.,	Ipswich.
Pilz, William H.,	Providence, R. I.
Price, A. F. (Dr.),	Sandwich.
Price, A. F. (Mrs.),	Sandwich.
Reed, Harris S.,	Quincy.
Rossley, Ralph R.,	Leicester.
Schatz, Phœbe,	Yantic, Conn.
Smith, William J.,	South Westport.
Spofford, Ralph O.,	Georgetown.
Strong, Ralph,	West Hatfield.
Tower, William H.,	North Adams.
Vondell, John H.,	Windsor, Vt.
Waterman, Fred T.,	Scituate.
Whitney, J. (Mrs.),	New Haven, Conn.
Woodard, John V.,	Dedham.
Wright, Mary B.,	Sunderland.

Six Weeks' Course, 1919.

Bartlett, Draper C.,	Amherst.
Call, George H.,	Colrain.
Carter, Herbert P.,	Andover.
Etheridge, William H.,	Salem.
Harris, Joseph F.,	Boston.
Heffernan, Cyril James,	Somerville.
Kimball, Arthur E.,	Danielson, Conn.
Lawrence, Edward Anthony,	Brooklyn, N. Y.
Orcutt, R. B.,	Sheffield.
Reader, Caleb,	Somerville.
Senneff, Harold Clifton,	Dorchester.
Sherwin, Herbert M.,	Worcester.
Whitten, Robinson Sawyer,	Winchester.

Summary of Short Courses.

	Men.	Women.	Total.
Ten Weeks' Course, 1918,	81	10	91
Summer School, 1918,	7	61	68
Two-year Course, 1918–19,	31	6	37
Ten Weeks' Course, 1919,	43	20	63
Six Weeks' Course, 1919,	13	–	13

INDEX.

PAGE

Calendar, ... 7
Historical statements, ... 9
Members of the corporation, ... 12
Faculty, officers, committees, ... 14–24
Admission, ... 27–38
Courses of instruction: —
General course requirements, ... 39–42
Outline of majors: —
In Division of Agriculture: —
Agriculture, ... 44
Agronomy, ... 45
Animal Husbandry, ... 46
Dairying, ... 47
Poultry Husbandry, ... 48
In Division of Horticulture: —
Floriculture, ... 49
Forestry, ... 50
Landscape Gardening, ... 51
Pomology, ... 52
Vegetable Gardening, ... 53
In Division of Science: —
Botany, ... 54
Chemistry, ... 55
Entomology, ... 56
Microbiology, ... 57
In Division of the Humanities: —
Rural Journalism, ... 58
In Division of Rural Social Science: —
Agricultural Economics, ... 59
Agricultural Education, ... 60
Rural Sociology, ... 61
Undergraduate courses: —
In Division of Agriculture, ... 65–73
In Division of Horticulture, ... 74–83
In Division of Science, ... 84–104
In Division of the Humanities, ... 105–116
In Division of Rural Social Science, ... 117–123
In General Departments, ... 124–128

PAGE

Graduate School, ... 131–147
Extension and short courses, ... 150–164
General information: —
Financial, ... 167–174
College activities, ... 175, 176
Academic and departmental, ... 176–187
Degrees conferred, ... 191, 192
Roll of Students: —
First term: —
Graduate, ... 193
S. A. T. C., ... 193
College, regular, ... 199
Summary by classes, ... 201
Second term: —
Graduate, ... 202
College, ... 202
Summaries, ... 209
Short course, ... 210

THE M. A. C. BULLETIN

Amherst, Mass.

Volume XI JUNE, 1919 Number 5

ANNOUNCEMENT

OF THE

TWELFTH SUMMER SCHOOL

JUNE 30–JULY 26

AGRICULTURE

HORTICULTURE

EDUCATION

HOME LIFE

The Massachusetts Agricultural College

and

The Massachusetts Board of Education

Co-operating

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

BOSTON
WRIGHT & POTTER PRINTING CO., STATE PRINTERS
32 DERNE STREET
1919

A View of the Campus, showing Library

THE M. A. C. BULLETIN
Amherst, Mass.

Volume XI JUNE, 1919 Number 5

ANNOUNCEMENT

OF THE

TWELFTH SUMMER SCHOOL

JUNE 30–JULY 26

AGRICULTURE
HORTICULTURE
EDUCATION
HOME LIFE

The Massachusetts Agricultural College
and
The Massachusetts Board of Education
Co-operating

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

BOSTON
WRIGHT & POTTER PRINTING CO., STATE PRINTERS
32 DERNE STREET
1919

Publication of this Document
approved by the
Supervisor of Administration.

FACULTY

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College

EDWARD M. LEWIS, A.M.
Acting President of the College

JOHN PHELAN, A.M.
Director of Short Courses

CHARLES R. GREEN, B.Agr.
Librarian of the College

	DEPARTMENT
ARTHUR B. BEAUMONT, Ph.D. *Associate Professor of Agronomy*	Soil Fertility
WALTER W. CHENOWETH, A.B., M.Sc. *Professor Horticultural Manufacture*	Horticultural Manufacture
ARTHUR L. DACY, B.Sc. *Associate Professor of Market Gardening*	Vegetable Gardening
EDITH DOBIE *Instructor, State Normal School, Westfield, Mass.*	Geography
GEORGE L. FARLEY, M.Sc. *Supervisor of Junior Extension Work*	Club Work
HENRY T. FERNALD, Ph.D. *Professor of Entomology*	Insect Pests
IDA E. FINLEY *Principal, Practice School, State Normal School, Framingham, Mass.*	Primary Language
CHRISTIAN I. GUNNESS, B.Sc. *Professor of Rural Engineering*	Farm Machinery
IDA E. HALL, LL.B.	Plays and Pageantry
MARGARET HAMLIN, B.A. *Supervisor Agricultural Courses for Women*	Vocational Guidance
WILLIAM R. HART, A.M., LL.B. *Professor of Agricultural Education*	Agricultural Education

	DEPARTMENT
Franklin E. Heald, A.M.	Vocational Agricultural Education
Agent for Agricultural Teacher-Training, Massachusetts Board of Education	
Orville A. Jamison, M.Sc.	Dairying
Associate Professor of Dairying	
Charles J. Maynard	Bird Life
Naturalist and Lecturer, West Newton, Mass.	
Charles E. Marshall, Ph.D.	Sanitation and Health
Director of the Graduate School and Professor of Microbiology	
Frederick A. McLaughlin, B.Sc.	Plant Diseases
Instructor in Botany	
A. Vincent Osmun, M.Sc.	Plant Life
Professor of Botany	
Loyal F. Payne, B.Sc.	Poultry
Associate Professor of Poultry Husbandry	
Byron E. Pontius, B.Sc.Agr.	Animal Husbandry
Associate Professor of Animal Husbandry	
Mrs. Ruth S. Reed	Clothing
Assistant State Home Demonstration Leader	
Frederick W. Ried	Practical Arts
Director of Practical Arts, State Normal School, Framingham, Mass.	
W. E. Riley	School Management
Instructor, State Normal School, Lowell, Mass.	
Fred C. Sears, M.Sc.	Pomology
Professor of Pomology	
Edna Skinner, B.Sc.	Home Management
Adviser of Women and Professor of Home Economics	
Charles H. Thompson, M.Sc.	Trees and Shrubs
Assistant Professor of Horticulture	
Andrew S. Thomson, Ph.B., A.M.	School Garden Supervision
Superintendent of Schools, South Deerfield, Mass.	
James Whiting	Flower Gardening
Foreman, Department of Floriculture	
Ellen C. Wood	Foods and Dietetics
Instructor, Simmons College	

ANNOUNCEMENT

The twelfth session of the Summer School will begin June 30 and close July 26.

This session of the Summer School will be under the joint direction of the Massachusetts Agricultural College and the Massachusetts Board of Education. The college will offer through its regular staff courses in agriculture, horticulture, related subjects, and home life, and in co-operation with the State Board of Education, vocational agricultural teaching.

The Massachusetts Board of Education will give a number of courses in education, including such subjects as principles of teaching, school management, primary reading, language, and other subjects of interest and value, both to experienced teachers and to those who wish to prepare for teaching.

Nature of Courses

The courses offered in the Summer School are planned to meet the needs of many groups of students who wish to employ a part of the summer as a period for study and improvement. The courses, though necessarily brief, are practical and comprehensive, designed to give the largest amount of information and training in the time devoted to them. The courses in agriculture, horticulture, and related subjects are intended for those who wish a general knowledge of theoretical and practical agriculture and who can come to the college conveniently during the summer session. These courses will prove especially attractive and valuable since it is possible during the summer to do much work in the field, thus combining theory and practice.

Agricultural Courses for Soldiers and Sailors

Men discharged from the military or naval service of the United States may with profit take advantage of the four weeks' courses in agriculture and horticulture given during the summer session. The

college has already offered two special six weeks' courses for returned soldiers and sailors. The first of these courses was begun in February of this year, and the second in April. They proved a desirable means of preparation for farming. These courses were elected by men of all degrees of educational attainment. Some were graduates of agricultural colleges, others had not finished high school. Though positions are not guaranteed, the college endeavors to assist these men in finding agricultural employment. Thus far all men taking the short courses who wished to secure work have been successful in finding positions.

Courses for Teachers

The conditions prevailing during the war and arising out of the war have created a shortage of teachers, not only in Massachusetts but all over the United States. The preparation of a larger number of teachers for service, especially in the elementary schools, is one of the greatest problems of education to-day. The attention of students who are preparing to teach is particularly directed to the courses offered by the Massachusetts Board of Education. The opportunities that the Summer School at Amherst offers this year for teachers in service who desire to advance professionally, and for men and women who wish to prepare for teaching, are exceptional. The number of courses offered by the college and the Massachusetts Board of Education makes possible a wide choice of subjects and provides for many combinations of courses.

Special Courses

Many students come to the Summer School to take work along special lines that can be offered to best advantage only during the summer session.

Courses in vegetable gardening, food preservation, floriculture, and garden supervision have always attracted a considerable body of students. The work in all these courses will be thoroughly practical, combining lecture and study with field experiment.

GENERAL INFORMATION

There are no entrance examinations or entrance requirements for the Summer School. The courses offered are open to students who come with a serious purpose and who are able to do and profit by the work selected.

All courses elected must be carried by the student in a manner satisfactory to the instructor in charge. Any change of elections must first be approved by the director of short courses. Regular attendance is required in all classes. Permission for any irregularity of schedule or attendance must be had from the director and the instructor concerned. Students who wish to visit classes must first secure a visitor's card from the short course office.

Students should plan to arrive at Amherst not later than Monday, June 30. Classes begin Tuesday morning, July 1, at 8 o'clock.

On Monday, June 30, students will enroll in Room 104, Stockbridge Hall. All members of the Summer School staff will be present during the day to advise with students in regard to election of courses.

Information in regard to board and rooms may be had at the short course office or may be secured by correspondence. The short course office is located on the second floor of South College, just above the office of the registrar. On registration day information in regard to board and rooms may be had at Room 104, Stockbridge Hall.

Fees.

Tuition is free. There are no incidental or registration fees to be paid in the Summer School.

Board, Rooms, etc.

Rooms will be provided in the college dormitories and in private homes adjoining the college grounds. In general, the dormitory rooms are in suites, consisting of two bedrooms and one study room.

The bedrooms are furnished with single beds. The two dormitories known as North College and South College are reserved for women students exclusively. The toilets and bathrooms are in the basements; water is not provided in the rooms. A uniform rate of $1.50 a week for each person will be charged for these rooms, and each pupil will be expected to supply her own blankets, sheets, pillow cases, towels, etc. Convenient arrangements for laundry work may be made in Amherst.

All requests for dormitory rooms must be made to the college treasurer. A deposit of $2 is required in order to secure a reservation in a dormitory. This deposit is not refunded to those who find it impossible to attend.

The college will also supply a limited number of first-class United States army wall tents for those who wish them. Each tent will accommodate two persons. The tents will be placed in a pleasant and convenient location on the college campus, and every reasonable provision will be made for the comfort of the occupants. This form of domicile has been found very acceptable in other summer schools, chautauquas, and camps. Those who care for real outdoor life at its best will find these arrangements genuinely enjoyable. The charge for these tents will be $1.50 a week for each person.

Rooms outside the college vary considerably in their accommodations and somewhat in price, the charge ranging from $2 to $3 a week for each person. A list of available rooms in the village will be furnished to Summer School students at the time of registration. Every effort will be made by those in charge to see that every one has comfortable accommodations.

A few furnished houses at reasonable rentals are usually available in Amherst during July and August.

The college maintains a cafeteria on the self-service plan in Draper Hall on the college grounds. Board may be had ranging from $4 to $6 per week. Good boarding places can also be secured outside of the college if desired.

The Summer Lectures and Entertainments

The summer lectures form an important feature of the advantages of the Summer School.

The summer lectures and entertainments form an important feature of the Summer School and provide a real opportunity for the students. It is planned to have the program include lectures, musicales and readings. All lectures and entertainments are free. Printed schedule showing dates will be furnished at the opening of the Summer School.

Social Events — Excursions

The social events for the Summer School will be under the control of a joint committee of faculty and students, who will arrange a program for the summer session. These events will include social evenings, picnics, excursions to industrial plants and places of historic interest.

The program of social events, lectures, etc., will be available the first week of the summer session.

Athletics and Recreation

Athletics and sports of various kinds occupy a prominent place in the Summer School. Tennis tournaments for both men and women are held and baseball teams are organized. Contests with teams from near-by towns are held, subject to the approval of the proper committee. Late afternoon and early evening periods will be used for this purpose. Athletics will be in charge of a director.

The region around Amherst is especially rich in attractive places for tramping, excursions, and picnics. The management of the Summer School usually arranges a suitable amount of this form of recreation.

AMHERST

Amherst is one of the most delightful towns in New England. It has long been noted for the natural scenic beauties surrounding it and as an educational center. It is located in the heart of the Connecticut Valley. The Holyoke range, Mount Tom, Mount Holyoke, Mount Toby, the Connecticut River, Old Deerfield, and other places of great scenic beauty and historic interest are within easy walking, trolley, or driving distance. The Berkshire and Hampshire Hills country is easily accessible.

The climate is good, and usually not excessively warm during July.

The surroundings of the Summer School, the organization and methods of work, are such as to make a stay enjoyable in every way. Provision will be made for athletics, recreation, and other outdoor entertainment, so that these will form an enjoyable part of the Summer School without interfering with class work. From the first, special attention has been given to the outdoor exercises and recreation features of the program.

Amherst is ninety-eight miles west of Boston and twenty-five miles from Springfield. It can be reached from Boston over the Boston & Maine Railroad (Southern Division from North Station) or by the Boston & Albany Railroad from South Terminal Station via Palmer, thence to Amherst over the Central Vermont Railroad. It may also be reached from Springfield or Greenfield by the Boston & Maine Railroad via Northampton, or by trolley from Springfield via Holyoke or Northampton.

Those coming from New York should take the New York, New Haven & Hartford Railroad to Springfield, then proceed to Amherst by train or trolley (as already stated).

Persons coming from Albany, Buffalo, and the West should come by way of Springfield.

THE COLLEGE

The Massachusetts Agricultural College is maintained by the Federal government and by the State of Massachusetts for teaching and investigation in agriculture in the broadest sense. The college has over 700 acres of land, most of which is in a high state of cultivation and illustrates most of the leading agricultural industries of Massachusetts. There is a large range of greenhouses of the most modern and approved type; there is a modern dairy barn with dairy cattle; there are good horses, pure-bred swine, sheep, and poultry; there are fields of corn, potatoes, clover, and grass in season; orchards of apple, peach, plum, and pear trees; tracts of good forest land, nurseries, and market gardens; in addition, a good school garden, maintained co-operatively by the college and the Amherst schools, will be in operation. There are also considerable tracts devoted to experiments, many of which are of unusual interest. Then there are well-equipped departments of botany, entomology, and chemistry, dealing in the most thorough manner with these special sciences. The advantages of the plant equipment and teaching staff are made available to Summer School students.

THE LIBRARY

The college library occupies the entire lower floor of the chape building and contains over 50,000 volumes, in addition to a large number of pamphlets. The library ranks extremely well among the agricultural libraries of the country. Summer School students are able to find splendid material in every line of college work, especially in agriculture, horticulture, botany, entomology, and sociology. The reading room is provided with a variety of magazines, encyclopedias, and reference books, in addition to the newspapers and agricultural weeklies.

DESCRIPTION OF COURSES

AGRICULTURE

Soil Fertility

This course is designed for the purpose of acquainting the student with the nature of soils, their properties and management; manures and fertilizers, their composition, value, preservation, and use. The origin and formation of soils, their physical and chemical characteristics, moisture control, including drainage and irrigation, tillage, the supply and maintenance of organic matter in the soil, soil acidity, limes and liming will be considered. Attention will be drawn to factors contributing to the depreciation of soil fertility and to ways and means of maintaining permanent fertility. Five exercises a week; four lectures and one two-hour laboratory of field exercise.

Associate Professor Beaumont

Breeds and Livestock Judging

As detailed a study as is possible of the different breeds and types of farm animals. The characteristics of draft, coach, roadster, and saddle horses are studied, with a brief review of the several breeds adapted to each class. The history, characteristics, and adaptations of the leading dairy and beef breeds of cattle are discussed. Feeding, especially of dairy cattle for economic milk production, and care and management consistent with the successful growing of live stock receive attention. Time is given to the judging of horses and dairy cattle. The work is made practical throughout. Five exercises a week; four weeks.

Associate Professor Pontius

General Animal Husbandry

A course dealing with the selection, feeding, and care of farm animals will be offered to meet the needs of students who wish a general course in animal husbandry. Owing to the limited time, the treatment of each topic must omit details. Considerable time will be given to laboratory exercises in stock judging, etc. Three lectures and two laboratory periods per week. Three classroom periods and two two-hour laboratory periods per week.

Associate Professor Pontius

Dairying.

This course is designed to acquaint the student with the science of dairying and its important place in the agriculture of New England. It is desirable that all people should know more of the value of milk and dairy products, and the vital place which they occupy in the diet of the American people. This course covers the composition and secretion of milk; the Babcock test for fat in dairy products; up-to-date methods of separating cream from milk; the modern ways of making butter and cheese of quality; the importance of milk as a food, its cheapness, care, and handling, and its relation to the public health. Five lectures per week for four weeks.

Associate Professor Jamison

Dairy Laboratory.

This course gives the actual practice in testing dairy products, handling milk, separating cream, and making butter and cheese as outlined in the foregoing course. Students taking the dairy laboratory work are required to take the dairy lectures as outlined above. Two three-hour laboratories per week for four weeks.

Associate Professor Jamison

Poultry Husbandry

This course includes a study of breeds and varieties, according to their standard and utility classification; incubation and brooding; housing; feeds and feeding; marketing eggs and poultry; and management of the flock. The laboratory exercises consist entirely of practical work. This includes a careful study of all the characters involved in selecting hens for high and low egg production; killing and dry picking, drawing, trussing, disjointing, and caponizing. Four lectures and one laboratory period a week; four weeks.

Associate Professor Payne

Farm Machinery and Gas Engines

This course is intended to familiarize the student with the various types of farm implements, to teach him their operation and care, and to give practice in the adjustment and repair of the mechanical equipment on the farm. The various types of field implements are studied, and emphasis is laid on the selection of implements suited to New England conditions. The gas engine is studied, and the application of the engine to farm work is taken up in detail. The farm tractor and the automobile are given due importance, and considerable time is devoted to the care and repair of these machines. The various types of carburetors and ignition systems are studied, and practice given in the location and repair of engine troubles. Two lectures and three two-hour laboratory periods.

Professor Gunness

Practical Work in Vegetable Growing

Organized Play

An Outdoor Classroom at the Summer School

HORTICULTURE

Fruit Growing

A study of modern methods of propagating, planting, cultivating, pruning, fertilizing, and spraying fruit trees; planning and managing orchards; selling fruit. Lectures, demonstrations, and field exercises. Five exercises a week; four weeks.

Professor Sears

Fruit Growing for Teachers

This course is designed especially for those teachers who may wish to introduce some elementary work in fruit growing into their school courses. It will consist of ten exercises, each one adapted to such school work, and the course will be conducted as such a course might be conducted in any school in the Commonwealth, that is, the apparatus used will be simple and the materials inexpensive.

The course will consist largely of laboratory work. Each student will do the actual work of every exercise and thus become reasonably proficient in it.

In addition to the laboratory work there will be a brief discussion of the scientific principles underlying the work in each exercise. Teachers will thus learn *why* things are done, as well as *how*.

There will be such exercises as budding apples, setting strawberries, making cuttings, top-grafting apple trees, and bridge-grafting girdled trees. Five exercises a week; first two weeks.

Professor Sears

Vegetable Gardening

This course will consider the principles underlying the successful culture of vegetables in the home, school, community, or factory garden. It will include a study of the preparation of the land, fertilizers, and manures, seeds and seeding, the growing of plants in hotbeds and cold frames, planning and planting the garden, garden

tools, the harvesting and storing of the garden products. Application of the principles studied in the classroom will be made in practical exercises in the student's gardens and with the large variety of crops grown on the ten acres of land operated by the Vegetable Gardening Department. Three classroom periods and two two-hour laboratory periods a week.

Associate Professor Dacy

Amateur Home and Flower Gardening

This course is planned to give amateurs the instruction necessary to enable them to grow flowers for the decoration of the home, the home garden, or the school garden without the use of greenhouses. The course is designed to familiarize the student with *what to do, how to do it,* and *when,* in order to have a supply of flowers for the home. The course will include, as far as flower growing is affected, a discussion of soils, fertilizers, insects, and preventives; the propagation of annuals, perennials, and bedding plants by seed cuttings and division; the culture of bulbs; and planting and care of the garden. The Department of Floriculture has a large garden devoted to the culture of annuals and perennials available for study. Special effort will be made to make the work practical. Three lectures and two two-hour demonstration periods a week; four weeks.

Mr. Whiting

Trees and Shrubs

A study of our cultivated trees and shrubs and such of our native material as may well be introduced into home planting. Special consideration will be given to their identification, propagation, uses, and care. Five exercises a week; four weeks.

Assistant Professor Thompson

Horticultural Manufactures

Food Preservation I. — This course aims to place before the student the latest and best methods in canning, evaporating, and the making of fruit and vegetable products, together with a study of the most approved types of equipment.

Fruits and vegetables will be canned in both tin and glass, using the hot-water bath, the water-seal canners, steam-pressure canners, and steam pasteurizer. Special attention will be given to the preservation of fruits and fruit juices for culinary purposes. Both home and commercial types of evaporators will be used for evaporating such fruits and vegetables as are available.

The manufacture of various fruit products, such as jams, jellies, preserves, butters, pastes, and leathers will occupy about one-half the course. The home manufacture of vinegar, sauerkraut, hominy, and other commonly used products will be studied if time permits.

Special attention will be given to the utilization of the surplus and cheap grades of fruits and vegetables so frequently a source of loss to the grower.

The course is planned primarily for the housewife and the teacher, but much of the work may be adapted to the community center or the small home factory. This course is a practical one, in that all theories and principles discussed in lectures will be applied by the student in the laboratory work.

Extends through the four weeks of school. Two lectures and three two-hour laboratory periods per week. Class limited to fifteen students.

Food Preservation II. — This course is offered for those who cannot devote the full four weeks to this type of work. Either the canning and drying or the manufacturing of fruit and vegetable products as outlined above will be studied, as the class may elect. Given the last two weeks. Two lectures and three two-hour laboratory periods. Class limited to fifteen students.

SUMMER SCHOOL SCHEDULE

	8 A.M.	9 A.M.	10 A.M.	11 A.M.
MONDAY	Soil Fertility Food Preservation Foods, Lab. A Clothing I, Lab. Primary Reading History Bird Life Amateur Flower Gardening	Breeds and Judging Vegetable Gardening, Lab. Foods, Lab. A Clothing I, Lab. Primary Language Reading for Upper Grades Principles and Methods of Teaching Agriculture	Dairying Vegetable Gardening, Lab. Foods, Lab. B Clothing II, Lab. Hygiene and Sanitation Arithmetic Plant Life (first 2 wks.) Plant Diseases (last 2 wks.) Vocational Agricultural Teaching	Animal Husbandry Fruit Growing Foods, Lab. B Clothing II, Lab. School Management Geography Insect Life
TUESDAY	Soil Fertility Elementary Dietetics A Amateur Flower Gardening, Lab. Home Management Primary Reading History Bird Life	Farm Machinery Clothing I Amateur Flower Gardening, Lab. Primary Language Reading for Upper Grades Principles and Methods of Teaching Agriculture	Dairying Elementary Dietetics B Vegetable Gardening Hygiene and Sanitation Arithmetic Plant Life (first 2 wks.) Plant Diseases (last 2 wks.) Vocational Agricultural Teaching	Fruit Growing Clothing II School Management Geography Insect Life
WEDNESDAY	Soil Fertility Food Preservation Foods, Lab. A Clothing I, Lab. Primary Reading History Bird Life Amateur Flower Gardening	Breeds and Judging Vegetable Gardening, Lab. Foods, Lab. A Clothing I, Lab. Primary Language Reading for Upper Grades Principles and Methods of Teaching Agriculture	Dairying Vegetable Gardening, Lab. Foods, Lab. B Clothing II, Lab. Hygiene and Sanitation Arithmetic Plant Life (first 2 wks.) Plant Diseases (last 2 wks.) Vocational Agricultural Teaching	Animal Husbandry Fruit Growing Foods, Lab. B Clothing II, Lab. School Management Geography Insect Life
THURSDAY	Soil Fertility Elementary Dietetics A Amateur Flower Gardening, Lab. Home Management Primary Reading History Bird Life	Farm Machinery Clothing I Amateur Flower Gardening, Lab. Primary Language Reading for Upper Grades Principles and Methods of Teaching Agriculture	Dairying Elementary Dietetics B Vegetable Gardening Hygiene and Sanitation Arithmetic Plant Life (first 2 wks.) Plant Diseases (last 2 wks.) Vocational Agricultural Teaching	Fruit Growing Clothing II School Management Geography Insect Life
FRIDAY	Amateur Flower Gardening Foods, Lab. A Clothing I, Lab. Primary Reading History Bird Life	Breeds and Judging Foods, Lab. A Clothing I, Lab. Primary Language Reading for Upper Grades Principles and Methods of Teaching Agriculture	Dairying Foods, Lab. B Clothing II, Lab. Hygiene and Sanitation Arithmetic Plant Life (first 2 wks.) Plant Diseases (last 2 wks.) Vocational Agricultural Teaching Vegetable Gardening	Animal Husbandry Fruit Growing Foods, Lab. B Clothing II, Lab. School Management Geography Insect Life

Junior Extension Club work, by arrangement. Professional Improvement

OF CLASS HOUR

2 P.M.	3 P.M.	4 P.M.	5 P.M.
Breeds and Judging, Lab. Poultry Husbandry Trees and Shrubs Design and Practical Arts Rural School Curriculum (first 2 wks.) Penmanship (last 2 wks.)	Breeds and Judging, Lab. Fruit Growing for Teachers (first 2 wks.) Vocational Methods Oral English (first 2 wks.) Plays and Pageantry (last 2 wks.) Home and School Garden Supervision (first 2 wks.) Native Ferns (first 2 wks.)	Farm Machinery, Lab. Food Preservation, Lab. (last 2 wks.) Organized Play Rural Sociology Home and School Garden Supervision (first 2 wks.) Native Ferns (first 2 wks.)	Farm Machinery, Lab. Food Preservation, Lab. (last 2 wks.)
Food Preservation, Lab. Poultry Husbandry, Lab. Dairying, Lab. Trees and Shrubs Design and Practical Arts Rural School Curriculum (first 2 wks.) Penmanship (last 2 wks.)	Food Preservation, Lab. Poultry Husbandry, Lab. Dairying, Lab. Vocational Methods Oral English (first 2 wks.) Plays and Pageantry (last 2 wks.) Home and School Garden Supervision (first 2 wks.) Fruit Growing for Teachers (first 2 wks.)	Food Preservation (last 2 wks.) Animal Husbandry, Lab. Dairying, Lab. Organized Play Rural Sociology Home and School Garden Supervision (first 2 wks.)	Animal Husbandry, Lab.
Breeds and Judging, Lab. Poultry Husbandry Trees and Shrubs Design and Practical Arts Rural School Curriculum (first 2 wks.) Penmanship (last 2 wks.)	Breeds and Judging, Lab. Fruit Growing for Teachers (first 2 wks.) Vocational Methods Oral English (first 2 wks.) Plays and Pageantry (last 2 wks.) Home and School Garden Supervision (first 2 wks.) Native Ferns (first 2 wks.)	Farm Machinery, Lab. Food Preservation, Lab. (last 2 wks.) Organized Play Rural Sociology Home and School Garden Supervision (first 2 wks.) Native Ferns (first 2 wks.)	Farm Machinery, Lab. Food Preservation, Lab. (last 2 wks.)
Food Preservation, Lab. Dairying, Lab. Poultry Husbandry Trees and Shrubs Design and Practical Arts Rural School Curriculum (first 2 wks.) Penmanship (last 2 wks.)	Food Preservation, Lab. Dairying, Lab. Fruit Growing for Teachers (first 2 wks.) Vocational Methods Oral English (first 2 wks.) Plays and Pageantry (last 2 wks.) Home and School Garden Supervision (first 2 wks.)	Animal Husbandry, Lab. Dairying, Lab. Food Preservation, Lab. (last 2 wks.) Organized Play Rural Sociology Home and School Garden Supervision (first 2 wks.)	Animal Husbandry, Lab. Food Preservation, Lab. (last 2 wks.)
Food Preservation, Lab. Soil Fertility, Lab. Poultry Husbandry Trees and Shrubs Design and Practical Arts Rural School Curriculum (first 2 wks.) Penmanship (last 2 wks.)	Food Preservation, Lab. Soil Fertility, Lab. Fruit Growing for Teachers (first 2 wks.) Vocational Methods Oral English (first 2 wks.) Plays and Pageantry (last 2 wks.) Home and School Garden Supervision (first 2 wks.) Native Ferns (first 2 wks.)	Food Preservation (last 2 wks.) Farm Machinery, Lab. Organized Play Rural Sociology Home and School Garden Supervision (first 2 wks.) Native Ferns (first 2 wks.)	Farm Machinery, Lab.

Problems, by arrangement. Vocational Guidance, by arrangement.

HOME LIFE AND PRACTICAL ARTS

Foods

This course includes a study of the selection and preparation of food; the fundamental principles underlying the cookery of various types of foods to conserve the largest amount of nutrients. The course is designed to meet the needs of teachers and homemakers, and must be accompanied by Elementary Dietetics. Three two-hour laboratory periods per week; four weeks.

Miss Wood

Elementary Dietetics

This course includes a study of the nutritive needs of the body; the relative nutritive value of various foods; a study of dietaries; the planning of balanced menus for adults and children under normal conditions of health, with special regard to limitation of cost. This course should be taken with Foods. Two lectures per week; four weeks.

Miss Wood

Home Management

This course makes a study of the factors in successful homemaking. It will include a study of systematic methods of housekeeping; care of the house; labor-saving devices; the problems of expenditure and the keeping of household accounts. Two lectures per week; four weeks.

Miss Skinner

Clothing I

This course includes a study of textiles used in clothing; cost and care of clothing; designing and drafting patterns; and the making of clothing. The work consists of demonstrations, discussions, and practical laboratory work. Three two-hour laboratory periods and two lectures per week; four weeks.

Mrs. Reed

Clothing II. Advanced Course

This course is devoted to the more difficult problems in garment making and illustrates the development of the fundamental principles studied in the first course. There will be demonstrations, discussions, and laboratory work. The method endeavors to eliminate all unnecessary movements, waste of time, energy, and material, trying on and fitting, and unwise designs. Open to students who have had Clothing I. Three two-hour laboratory periods, two lectures per week; four weeks.

Mrs. Reed

Design and Practical Arts

Lectures and laboratory work developing the value of design, color, and handwork as a rural school asset. Work in binding and its various problems, basketry, elementary weaving, thin and thick cardboard construction, leather work, and rural dyeing; also other phases of rural prevocational subject matter; also rural community craft-work. Those taking this work should bring 9 by 12 inch drawing paper, carbon paper, scissors, ruler, eraser, knife, and pencils. Five exercises a week; four weeks.

Mr. Reid

Vocational Methods

An interpretation of the State course in Vocational Methods. This course has been especially outlined for vocational schools and has already made radical changes in the teaching of industrial arts. Given if ten or more call for it. Classes limited to twenty. Five exercises a week; four weeks. Open to those with trade experience or those desiring to teach in a trade school with the idea of getting trade experience later.

Mr. Reid

EDUCATION

School Management

Organizing the work of the school, — formation of classes, making the program, governing the school, keeping of records, care of property, relations of the school to the school system, to the parents, and to the community. Five exercises a week; four weeks.

Mr. Riley

Rural School Curriculum

Brief study of the curriculum for rural elementary schools.

Consideration of the aims, content, and method. Five exercises a week; last two weeks.

Mr. Riley

Primary Reading

Methods of teaching reading in the primary grades, — phonics, story telling, dramatization, sight reading (oral and silent), memory selections, seat work. Five exercises a week; four weeks.

Miss Finley

Primary Language

Methods of teaching oral and written composition in the primary grades. Language games and lessons to direct children in good habits of speech.

Miss Finley

Arithmetic

Fundamental aims in teaching arithmetic in the first six grades. Choice and sequence of subject matter, outlining topics, preparation and assignment of lessons, methods of securing skill in computation. Five exercises a week; four weeks.

Miss Dobie

Geography

Course in methods for the first six grades, content of home geography, methods of developing subject matter in successive grades. Use of textbooks, collateral reading, and illustrative material. Five exercises a week; four weeks.

Miss Dobie

Penmanship

Methods of teaching penmanship in the elementary schools. Five exercises a week; first two weeks.

Mr. Riley

United States History

Fundamental aims in history teaching; the great periods to be emphasized; effective methods of presenting the subject. Use of pictures, blackboard maps, and other illustrative material. Five exercises a week; four weeks.

Reading for Upper Grades

Aims to be sought in teaching reading in the upper grades. Choice of literary material for pupils in upper grades, methods of teaching, means of cultivating the habit of reading good books. Five exercises a week; four weeks.

Plays and Pageantry

Dramatic expression is essential to the full development of human beings. A little child uses it naturally in his play. The older child needs it to lighten his labor, and to enable him to accommodate himself to his social environment. Mothers, teachers, and social workers may find the course suggestive.

Miss Hall

Oral English and Parliamentary Practice

Oral English is a popular subject in high and junior high schools. The course is helpful to teachers of English in any grade. Parliamentary practice covers the simple necessary steps for organizing and conducting ordinary meetings, apart from the intricacies of parliamentary law. Daily rehearsals will promote proficiency.

Miss Hall

Hygiene and Sanitation

The course will treat the following subjects: (1) the human body in health and disease; (2) micro-organisms of disease; (3) products of micro-organisms and disease production; (4) channels of infection; (5) air and health; (6) water supply; (7) sewage disposal; (8) milk supply; (9) food poisonings; (10) food infections; (11) reciprocal relation of body and causal agent of disease; (12) factors of resistance; (13) vaccines; (14) use of sera, etc.; (15) infectious diseases; (16) infectious diseases; (17) isolation and disinfection; (18) principles of personal hygiene; (19) public health organization; (20) health, — a private and public asset. Five hours per week; four weeks.

Professor Marshall

Vocational Guidance

A seminar course, by arrangement, for women who intend to follow agriculture as a vocation. The course will deal with the preparation and opportunity for women in the various forms of agricultural work.

Miss Hamlin

Junior Extension Club Work

A course intended for those who expect to act as directors of Junior Extension Club work. The work will be given in a series of conferences conducted by the Junior Extension leaders.

Mr. Farley

Bird Life

Methods in bird study illustrated by specimens of birds. Special stress is laid upon the identification of birds as seen in the field, thus including nesting and other habits, and economic value to man. In addition to the lectures, walks will be taken each afternoon for field observations; study of songs, habits, etc. Five exercises a week; four weeks.

Mr. Maynard

Insect Life

This is an introductory course arranged with particular reference to the needs of teachers in grade schools and high schools who are expected to teach about insects, either as a part of nature study or in their relation to agriculture. The course is also planned to be a useful one for persons not teachers who desire a general knowledge of insects and methods for their control. Familiarity with the most common insects, particularly the injurious ones, a general knowledge of how they live and how and when they may best be attacked, are the main topics included in the lecture work. Field exercises examining living insects, their habits, and the injuries they cause will be arranged for in addition to the regularly scheduled hours, for those who may desire them. Five exercises a week; four weeks.

Professor Fernald

Home and School Garden Supervision

A course based upon actual experience, and planned for teachers and others who are looking forward to positions as supervisors of boys' and girls' home and school garden work. The following points are emphasized: (1) selecting, preparing, planting, and caring for the backyard garden; (2) conducting work with groups of children in community and school gardens; (3) organizing clubs for home work, sources and uses of literature, and methods of establishing co-operative relations between the home and the school. It is

recommended that course 1, Soil Fertility, be taken with this course. Supervisors of experience will present their methods of organizing and supervising these lines of work. Five two-hour exercises a week; two weeks.

Supt. Thomson

Native Ferns

This is a popular course for the study of our native ferns. Brief study of life history is conducted in the laboratory. Most of the time is spent in the field with identification keys and in becoming familiar with the ferns in their native haunts. Three two-hour periods a week; first two weeks.

Professor Osmun

Plant Life

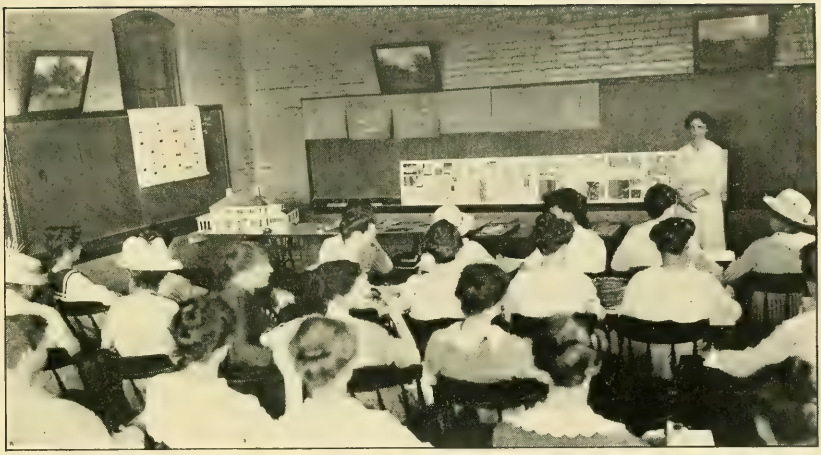
An outline of the anatomy, morphology, and physiology of higher plants. This course is especially suited to the needs of teachers of science and nature study and to amateur botanists. Previous training in the subject is not required. Five exercises a week; first two weeks.

Professor Osmun

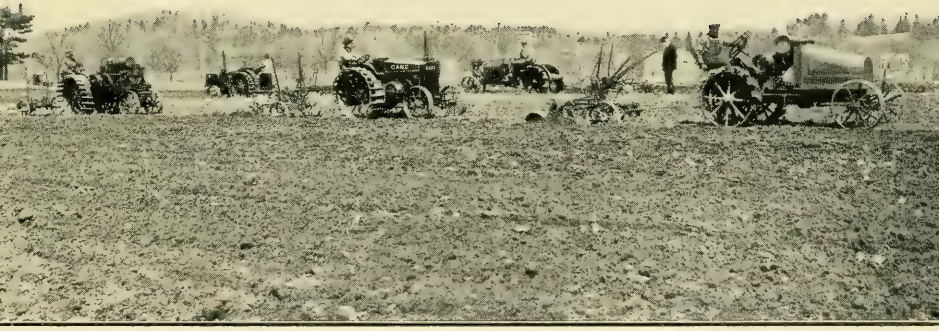
Plant Diseases

The more common diseases of vegetable, fruit, and flower crops are considered, together with methods of control. The course is planned to meet the needs of teachers and others interested in gardening and garden supervision. Diseased plant materials are used for illustrative purposes. The course in general botany should be taken as a preparation for this course by all who have had no previous training in botany. Five lectures a week; last two weeks.

Mr. McLaughlin



Class in Home Economics



A Course in Gas Engines and Tractors is offered in the Summer School

Rural Sociology

A seminar course designed for teachers, or prospective teachers of rural sociology, will be offered under the following conditions: —

The course this summer will be planned so as to familiarize the student with some of the literature in the field, and to lay the foundation for a directed course of reading and study to be carried on by the students during the following year. Students will then be expected to return for the 1920 Summer School and take several courses in the subject. A series of courses will be offered that will meet their needs in the 1920 Summer School.

The demand for teachers in this field of work far exceeds the supply. The positions are reasonably well paid and desirable, but they are available only to men of maturity, with rural experience and college training.

Registration for this course is limited to men who in the judgment of the instructor could later be recommended for a position. Students desiring this course should correspond with the instructor before the opening of the Summer School.

Professor Phelan

Organized Play and Recreation

The theory and demonstration of play as a creative force, developing in the individual social consciousness, and in the group individual responsibility for standards of living in the home and the community. There will be special emphasis on methods of organizing and directing games. An effort will be made to work out games that will contribute to the social life of the community. Demonstrations form a prominent feature of the work. Three lectures and two afternoon demonstrations a week; four weeks.

VOCATIONAL AGRICULTURAL TEACHING

A joint arrangement is being made whereby the Massachusetts Agricultural College will co-operate with the Massachusetts Board of Education in training teachers for vocational agriculture under the Smith-Hughes act. In addition to the pre-employment training of such teachers in undergraduate courses, the college plans to co-operate in certain phases of the professional improvement work for the teachers in service. As one phase of this work, employed teachers in agriculture or related subjects may occasionally be able to spend their professional improvement period at the college, either during the Winter Short Course period or during the Summer School.

The Department of Agricultural Education at the college will co-operate with the agent for Agricultural Teacher-Training of the State Board of Education for the purpose of providing such courses in general education and special method as may supply the needs of men who may apply for such courses.

While primarily intended for men now in service, the courses will be open to high school teachers, principals, or others who have had the necessary farm experience and other qualifications, and who express their intention of entering the field of vocational education. The demands for such teachers keeps pace with the supply and every effort will be made to assist men to qualify.

During the Summer School such persons will be able to obtain instruction in agricultural subjects. Professor Hart will offer a course in Principles and Methods of Teaching Agriculture, and the State agent for Agricultural Teacher-Training will conduct during the entire term, if there is sufficient demand, a seminar course

covering the concrete applications of the fundamental principles of teaching to the situations arising in vocational schools and departments of agriculture under the Smith-Hughes act. For active teachers of vocational agriculture this phase of the work becomes a shorter and more intensive course, so as to enable the men to return to duty about July 12.

If enough men should request any single subject-matter course to make it worth while, arrangements will be made to provide the necessary instruction. Credit will be given by the State Board of Education towards approval of candidates or for professional improvement projects.

Principles and Methods of Teaching Agriculture

This course deals with both the vocational and cultural aspects of agricultural knowledge; the project method of teaching agricultural practice and the related scientific factors; the problem method of studying agricultural science. Agricultural teaching for grammar, high school, and college grades will be treated. The work will be carried on by means of lectures, readings, discussions, and inspection of projects in the vicinity of Amherst. Five hours per week.

Professor Hart

Principles and Methods of Teaching Vocational Agriculture

Primarily for persons engaged in teaching agriculture or those preparing to do so. The course treats of the psychology and pedagogy of the project method of teaching agriculture and the relation of formal science to agriculture. Five hours per week.

Professor Hart

Professional Improvement Problems

A seminar course for employed or prospective teachers or directors of vocational agriculture dealing with the problems which have arisen in the agricultural schools of the State recently, and the campaign for improved methods; plans for the coming year by the agents of the Massachusetts Board of Education. This is essentially a course in special method for vocational agriculture. Class meets six days per week for first two weeks and four days per week for the last two weeks. Hours to be arranged.

Mr. Heald

PLANS FOR SUMMER SCHOOL OF 1920

The plans for the 1920 Summer School involve the following modifications in the present arrangement: —

1. The extension of the Summer School period of from four to six weeks.

2. An increase in the number of courses offered in general agriculture and horticulture. It is hoped that by offering double courses in some of these subjects college credit may be had. Courses in continuation of these offered this summer will be offered.

3. More courses will be offered in general and vocational education.

4. A series of courses in rural social science as a preparation for teaching will be offered.

APPLICATION FOR REGISTRATION

TWELFTH SUMMER SCHOOL, 1919

MASSACHUSETTS AGRICULTURAL COLLEGE
AND
MASSACHUSETTS BOARD OF EDUCATION
CO-OPERATING

Name (Mr., Mrs., or Miss)_____

Post office_____ Street address_____

State_____ Present occupation_____

Schools previously attended_____

Reference (name and address)_____

Name and address of person to whom word may be sent in case of illness or accident.

On the back of this sheet check the courses that you wish to take and mail to JOHN PHELAN, Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

Subjects Offered in the Summer School, 1919

All classes meet five times a week unless otherwise specified. Advance enrollments are of assistance in making the schedule, so that conflicts may be avoided.

Agriculture

- Soil Fertility
- Animal Husbandry
- Breeds and Live Stock Judging
- Dairying
- Poultry Breeding and Management
- Farm Machinery and Gas Engines

Horticulture

- Fruit Growing
- Fruit Growing for Teachers (two weeks)
- Vegetable Gardening
- Trees and Shrubs
- Food Preservation
- Food Preservation (two weeks)
- Amateur Home and Flower Gardening

Home Life and Practical Arts

- Foods
- Elementary Dietetics
- Home Management
- Clothing Efficiency (beginners)
- Clothing Efficiency (advanced students)
- Vocational Methods

Education

- School Management
- Rural School Curriculum
- Primary Reading
- Upper Grade Reading
- Primary Language
- Arithmetic
- Geography
- History
- Penmanship
- Organized Play and Recreation
- Plays and Pageantry (two weeks)
- Hygiene and Sanitation
- Home and School Garden Supervision
- Oral English and Parliamentary Practice (two weeks)
- Junior Extension Club Work (by arrangement)
- Design and Practical Arts

Vocational Agricultural Teaching

- Principles and Methods of Teaching Agriculture
- Principles and Methods of Teaching Vocational Agriculture
- Professional Improvement Problems

Related Subjects

- Insect Life
- Plant Diseases (two weeks)
- Native Ferns (two weeks)
- Bird Life
- Rural Sociology
- Plant Life (two weeks)

THE M. A. C. BULLETIN

Amherst, Mass.

Volume XI SEPTEMBER, 1919 Number 6

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

ANNOUNCEMENT

OF THE

TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE

1919

A view of the campus showing library

THE M. A. C. BULLETIN Vol. XI, No. 6

The Two-Year Short Course in Practical Agriculture

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE

CALENDAR

1919

September 22, Monday,	Registration begins
September 24, Wednesday, 1.30 P.M.,	Fall term begins; chapel
November 26, Wednesday, 12 M. to Friday, November 28, 1 P.M.,	Thanksgiving recess
December 19, Friday, 5 P.M.,	Fall term closes
December 29, Monday, 1 P.M.,	Winter term begins

1920

March 19, Friday, 5 P.M.,	Winter term closes
March 29, Monday, 1 P.M.,	Spring term begins
June 22, Tuesday,	Spring term closes

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

BOSTON
WRIGHT & POTTER PRINTING CO., STATE PRINTERS
32 DERNE STREET
1919

Publication of this Document
approved by the
Supervisor of Administration.

FACULTY, 1919

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College

EDWARD M. LEWIS, A.M.
Dean of the College

JOHN PHELAN, A.M.
Director of Short Courses

PHILIP B. HASBROUCK, B.Sc.
Registrar of the College

RALPH J. WATTS, B.Sc.
Secretary of the College

CHARLES H. PATTERSON, A.B., A.M.
Assistant Dean of the College

FRED C. KENNEY
Treasurer of the College

	DEPARTMENT
LUTHER BANTA, B.Sc. *Instructor in Poultry Husbandry*	Poultry
ARTHUR B. BEAUMONT, Ph.D. *Professor of Agronomy*	Soil Fertility
ALEXANDER E. CANCE, Ph.D. *Professor of Agricultural Economics*	Agricultural Economics
WALTER W. CHENOWETH, A.B., M.Sc. *Professor of Horticultural Manufactures*	Horticultural Manufactures
WILLIAM D. CLARK, A.B., M.F. *Professor of Forestry*	Forestry
HERBERT P. COOPER, M.Sc. *Assistant Professor of Agronomy*	Field Crops
ARTHUR L. DACY, B.Sc. *Associate Professor of Vegetable Gardening*	Vegetable Gardening
BROOKS D. DRAIN, B.Sc. *Assistant Professor of Pomology*	Fruit Growing
HENRY T. FERNALD, Ph.D. *Professor of Entomology*	Entomology
JAMES A. FOORD, M.Sc.Agr. *Professor of Farm Management*	Farm Management
HELENA T. GOESSMANN, M.Ph. *Instructor in English*	English
HAROLD M. GORE, B.Sc. *Assistant Professor of Physical Education*	Physical Education
CHRISTIAN I. GUNNESS, B.Sc. *Professor of Rural Engineering*	Rural Engineering

MARGARET HAMLIN, B.A. . . . . Agricultural Courses for Women
Adviser

ARTHUR K. HARRISON . . . . . Mechanical Drawing
Assistant Professor of Landscape Gardening

WILLIAM R. HART, A.M., LL.B. . . . . Agricultural Education
Professor of Agricultural Education

CURRY S. HICKS, P.Pd. . . . . Sanitation and Hygiene
Professor of Physical Education and Hygiene

ORVILLE A. JAMISON, M.Sc. . . . . Dairying
Associate Professor of Dairying

CHARLES E. MARSHALL, Ph.D. . . . . Microbiology
Director of the Graduate School and Professor of Microbiology

FREDERICK G. MERKLE, M.Sc. . . . . Soil Fertility
Instructor in Agronomy

JOHN C. MCNUTT, B.Sc.Agr. . . . . Animal Husbandry
Professor of Animal Husbandry

A. VINCENT OSMUN, M.Sc. . . . . Botany
Professor of Botany

JAMES B. PAIGE, B.Sc., D.V.S. . . . . Veterinary Science
Professor of Veterinary Science

LOYAL F. PAYNE, B.Sc. . . . . Poultry Husbandry
Associate Professor of Poultry Husbandry

BYRON E. PONTIUS, B.Sc.Agr. . . . . Animal Husbandry
Associate Professor of Animal Husbandry

GEORGE F. PUSHEE . . . . . Rural Engineering
Shop Assistant

FRED C. SEARS, M.Sc. . . . . Pomology
Professor of Pomology

EDNA L. SKINNER, B.Sc. . . . . Home Economics
Professor of Home Economics

S. E. VANHORN . . . . . Dairying
Instructor in Dairying

GILBERT WATTS, B.Sc. . . . . Vegetable Gardening
Instructor in Vegetable Gardening

JAMES WHITING . . . . . Floriculture
Foreman Department of Floriculture

CHARLES R. GREEN, B.Agr.
Librarian of the College

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Two-Year Course in Practical Agriculture was organized in 1918 to meet the demand for a thorough short course in agriculture and horticulture that might be taken by students who either did not possess college entrance requirements or who for one reason or another were unable to take the regular four-year college course. The course as now organized makes available to the student three courses in agronomy, five courses in animal husbandry, five courses in fruit growing, six courses in rural engineering, five courses in dairying, four courses in poultry, four courses in rural home life, one course in farm manufacturing, three courses in forestry, four courses in farm business, one course in hygiene and sanitation, one course in English, three courses in vegetable gardening, three courses in floriculture, one course in insect pests, and two courses in botany. The advantages of the college staff of specialists and the college plant with all its resources are thus made available to young men and young women who may not have had the opportunity of securing a high school education.

This course will appeal not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming. Although the course is planned to meet the needs of those who are not graduates of high schools, the instruction is not preparatory or elementary in its nature, but is so arranged that it will be of value to all. The greater amount of academic training that some of the students may possess will in a measure be offset by the fund of practical knowledge possessed by many who have completed only the elementary schools.

The Plan of the Two-Year Course

The Two-Year Course in Practical Agriculture is so arranged that the student receives instruction in fundamental subjects and is given

an opportunity to select the lines of work during the second year in which he is particularly interested.

The first year consists of six months of study at the college. The term begins with the college fall term and closes with the winter term of the regular session. The same vacation periods are observed as in the regular four-year course. The student pursues during the first year two courses in soil fertility, two courses in animal husbandry, two courses in fruit growing, one course in farm machinery, one in shop mechanics, one in dairying, one in poultry, one in farm structure, one in hygiene, and one in farm law.

At the close of six months of study, students are required to gain six months of farm experience. The college will assist students in finding positions and in placing them on farms where the experience gained will be of great advantage. Thus, an effort will be made to place on a dairy farm the man expecting to take up dairying as his chief line of work, and a student of pomology on a fruit farm.

During the second year the student spends nine months in resident study. Courses in plant diseases, crops, insect pests, feeding, farm management, marketing, and farm problems are required of all students.

In addition, the student selects from the following list of subjects three which he will carry throughout the year: fruit growing, dairying, poultry husbandry, vegetable gardening, forestry, floriculture, and rural home life.

During the winter and spring terms of the second year there are elective subjects from which the student may complete his program. These courses include: breeding, animal diseases, gas engines, dairying, carpentry, drainage and irrigation, agricultural credit, farm manufacturing, and dairy bacteriology.

The course is not intended for students enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement either from the principal of the high school or from parent or guardian asking permission to be enrolled.

The Course of Study of the Two-Year Course in Practical Agriculture

FIRST YEAR

First Term		*Second Term*		*Third Term*
Soil Fertility	3	Fertilizers	3	Six months' farm experience
Types and Breeds	5	Principles of Feeding	3	
Fruit Growing	3	Fruit Growing	2	
Farm Machinery	3	Repair of Farm Equipment	2	
Sanitation and Hygiene	3	Dairy	3	
English [1] or	3	Poultry	3	
Farm Structures [2]	5	English [1] or	2	
		Farm Law [2]	5	

Rural Home Life is offered as an elective for women during the first year instead of Farm Structures and Farm Law.

Farm and Community Problems once a week throughout the year, required.

SECOND YEAR

First Term		*Second Term*		*Third Term*	
Crops	5	Farm Management	5	Marketing	5
Insect Pests	5	Plant Lite	3	Social and Economic Problems	3
Feeding and Management	3			Plant Diseases	5

Three electives must be chosen from the following list in the fall and carried throughout the second year: —

First Term		*Second Term*		*Third Term*	
Fruit Growing	3	Fruit Growing	3	Fruit Growing	3
Dairy	3	Dairy	3	Dairy	3
Poultry	3	Poultry	3	Poultry	3
Vegetable Gardening	3	Vegetable Gardening	3	Vegetable Gardening	3
Forestry	3	Forestry	3	Forestry	3
Floriculture	3	Floriculture	3	Floriculture	3

Additional electives from which the student may choose, one in the winter and two in the spring term: —

First Term		*Second Term*		*Third Term*	
Farm Manufacturing	3	Animal Breeding	3	Animal Diseases	3
		Carpentry	3	Gas Engines	3
		Dairy Bacteriology	3	Agricultural Credit	3
				Drainage and Irrigation	3

Rural Home Life is offered as an elective for women during the second year.

Farm and Community Problems once a week throughout the second year, required.

---

[1] English is required of all students who show special deficiency.

[2] Farm Structures and Farm Law are given to the better prepared students but not required of those having to take English. This arrangement makes a heavier schedule for better prepared students.

Instruction

The instruction is given by the regular faculty by means of classroom teaching, laboratory exercises, and practical work. The work of the classroom is supplemented by demonstration work in the laboratory, dairy room, greenhouse, and stables. The library of 60,000 volumes offers exceptional opportunities for special study in agriculture, horticulture, and related sciences. The instruction is designed to offer plain, practical, direct information, and to establish the underlying reasons as well as the method employed in the various operations.

Entrance Conditions

There are no entrance examinations or entrance conditions other than that students must be seventeen years of age or over and have completed the elementary or common schools. They must have had six months' practical farm experience before they will be permitted to enroll for the work of the second year. This experience may be gained after the first year of study at the college.

In order that proper arrangements may be made for accommodations, it is important to know, as accurately as possible, the number of students who expect to attend. All persons intending to enroll in the Two-Year Course are advised to make application as early as possible to the Director of Short Courses.

Each student is required to file with the treasurer of the college a statement, signed by the town (or city) clerk of the town (or city) from which he enrolls, stating that the parent or guardian of the student is a resident of that town.

Agricultural Opportunities for Women

Agriculture is a field in which women are finding increasingly good opportunities. Poultry keeping, fruit growing, floriculture, dairying, truck farming, general farming, — all offer favorable openings for women. In all of these branches of agriculture women are farming

independently. There are also paid positions as farm workers or managers which are available for the agriculturally trained woman. For the woman or girl whose home is already upon the farm, the opportunity is exceptionally good. With the help of an agricultural education, there are open to her many means of increasing her own or the farm income. With the knowledge of farm life which she already possesses, and with the possibility of securing occasional help from her family, she can easily carry on and develop a profitable enterprise of her own. The Two-Year Course in Agriculture will afford to the women who wish to engage in farming the practical training which they will need to fit them for their work, and will open to them new doors of opportunity. The particular problems which the women engaged in farming will have to meet, and the special lines, etc., of farming in which they will have favorable opportunities, will be considered in a series of conferences.

The demand for women to fill agricultural positions during the past year was far in excess of the supply. Women who are interested in taking agricultural courses should correspond with Miss Margaret Hamlin, who acts as adviser for agricultural courses for women. Women interested in home economics should address Miss Edna L. Skinner.

Tuition, Fees and Expenses

Tuition is free to residents of the Commonwealth. Students who are not residents of Massachusetts pay a fee of $20 a term.

Board may be obtained at the college dining hall for approximately $6 a week.

Students who do not live in the college dormitories must secure rooms approved by the college. The assignment of rooms and the general supervision of the housing of students of the short courses are in charge of the Director of Short Courses. The rent for furnished rooms in private houses ranges from $1 to $3 per week for each occupant.

Besides the cost of room and board, there are other financial obli-

gations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for the maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. The following laboratory fees are charged: —

	Per Term.
Agronomy, S–1, S–2, S–26	$1 50
Agronomy, S–25, S–27	2 00
Animal Husbandry, S–1	1 50
Dairying, S–2, S–25, S–26, S–27	3 00
Poultry, S–25, S–26, S–30	2 00
Rural Engineering, S–1, S–2, S–26, S–27, S–30	1 50
Vegetable Gardening, S–25, S–27	1 50

Reports and Certificates

In order to obtain a certificate a student is expected to have satisfactorily completed 100 units of credit. A unit is the equivalent of one classroom exercise a week throughout a term of twelve weeks. Thus, a class which meets three times a week would give a student three units' credit toward a certificate. A class exercise may be one, two or three hours in length.

At the close of the term students will receive a formal report showing the standings gained in the subjects pursued by them, provided a request to receive such a report is made to the registrar of the college.

Upon the satisfactory completion of the Two-Year Course the student is given a certificate showing the courses he has completed and the grades attained therein.

Positions

While the college does not guarantee positions it frequently has calls for capable, energetic men and women with farm experience. The demand for students to fill positions has been greater than the supply. The opportunity for farm positions is exceptionally good.

How to Enroll

1. Plan to arrive in Amherst so as to register not later than Monday, September 22, for the first term. For the second term classes will begin Monday, December 29.

2. Upon arrival, report at the office of the Director of Short Courses, located in South College, where information may be obtained in regard to board and room, schedule of classes, etc.

3. Make out the application for enrollment which will be supplied by the Director of Short Courses. This enrollment may be made in advance by correspondence. Students who expect to take the courses are advised to correspond with the Director of Short Courses.

4. Present the application for enrollment at the office of the Registrar, who will issue a class card that must be signed by the (1) Registrar, (2) Treasurer, (3) Director of Short Courses, and (4) by the instructors in whose classes the student enrolls.

5. Go to the Treasurer's office to pay laboratory fees.

6. Return the enrollment card *within three days* to the office of the Registrar. The card should have the signatures stated above.

7. Attend all general college exercises.

Rules and Regulations

As a guide to those who come to the college for the first time the following extracts are taken from the regular rules of the college: —

The customary high standard of college men in honor, manliness, self-respect, and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend but also to name conditions under which students may remain in the institution.

All students enrolled in the Two-Year Course will be expected to attend the regular required college exercises.

General Exercises

On Wednesday afternoon an assembly is held at which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

THE INFIRMARY

The college maintains an infirmary for the care of sick or injured students. Students are urged to go to the infirmary when in need of the services rendered by the resident nurse or by a physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that students will go to the infirmary at his suggestion.

The infirmary fee is $1.50 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights.

THE LIBRARY

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 60,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 6 P.M. and 7 to 9.30 P.M. every week day, and from 9 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find splendid material for their line of college work and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

Fertilizer mixing

Tractors at work

DESCRIPTION OF COURSES

AGRONOMY

Three courses in agronomy are required of all students completing the two-year course, — soils and fertilizers during the first year, and crops in the second year. In addition to these courses the student is required to take courses in plant life and in plant diseases, offered by the Department of Botany. An elective course in drainage and irrigation is offered by the Department of Rural Engineering.

The Department of Agronomy has a good equipment for the presentation of its courses. The laboratories for soils and fertilizers include one for elementary work, supplied with locker equipment for 200 students, and one for advanced work, accommodating 80 students. These laboratories are equipped with steam and electric ovens, balances, centrifuge, microscopes, and other apparatus necessary for a study of soils and fertilizers. Storerooms, stock rooms, and balance rooms are located convenient to the laboratories. There is also a workroom attached, equipped with power machinery for grinding soils, fodders, and the like.

The crops' laboratories include one for seed study, having locker equipment for 50 students, and a laboratory for the study of cereals, forage crops, roots, etc., with lockers for 64 students. The equipment of these laboratories includes steam ovens, constant temperature electric ovens, ovens for seed germination, Brown-Duval moisture apparatus, balances, microscopes, collections of seeds, grasses, tubers, weeds, etc. A balance room, root cellar, and two storerooms, one of which is mouse-proof, are also used for crop work.

A modern steam-heated greenhouse 25 by 35 feet, used for work in soils and crops, is a valuable part of the equipment. Near the greenhouse is a crop garden on which different varieties of corn,

grasses, clovers, etc., are grown for demonstration purposes and as a source of material for class work. In addition, the general college farm of 250 acres is used for field study in soils and crops, and as a source of material.

S–1. Soils. (First year, first term, required.)

This course includes a general and detailed study of soils, with particular emphasis on the soils of Massachusetts. The subject matter will be presented by means of lectures, demonstrations, laboratory exercises, and field trips, and will include, as far as possible, studies and discussions of the origin and the formation of soils; classes and types of soils; the control of soil moisture; tillage operations of the farm; organic matter; its importance and maintenance; acid soils and liming; the improvement and management of extreme types of soils; and the fertility of the soil in the various aspects. Two class hours and one two-hour laboratory period or field exercise a week. Credits, 3.

Professor Beaumont

S–2. Fertilizers. (First year, second term, required.)

The principles and practices bearing on soil fertility will be reviewed. Manures, fertilizers, and soil amendments will be studied in detail. Considerable time will be devoted to actual work with fertilizing materials by the student, and he will be expected to become thoroughly familiar with farm manures, forms of agricultural lime, and commercial fertilizers, their composition, properties, care, and use. One class hour and two two-hour laboratory periods a week. Credits, 3.

Professor Beaumont

S–25. Crops. (Second year, first term, required.)

A course covering the rotation and structure of crops; their adaptation to soils and climate; varieties and the selection of seed; the preparation of the soil, fertilization, planting, cultivation, care, harvesting, and use of field crops. Corn, oats, rye, barley, buck-

wheat, grasses, clovers, beans, peas, potatoes, and root crops will be studied. Actual practice with growing crops in the field and greenhouse, and with prepared specimens in the laboratory, including the judging of corn and potatoes, will be given. Two class hours a week and three two-hour laboratory periods. Credits, 5.

Professor Cooper and Assistants

S–26. Plant Life. (Second year, second term, required.)

A knowledge of plant life is fundamental in agricultural education. It intimately concerns the husbandman, for it touches his operations at many points. Its connection is not merely theoretical, it is eminently practical. This course deals with the structure and life processes of plants in general, including growth, sources, absorption and assimilation of food, and reproduction. Types of plant life, especially the lower forms which have an economic bearing on agriculture, are given considerable attention. Two lectures and one two-hour laboratory period per week. Credits, 3.

Department of Botany

S–27. Plant Diseases. (Second year, second term, required.)

Diseases of crops annually exact a toll amounting to many millions of dollars. The importance of controlling these diseases is generally recognized, and the modern farmer considers a knowledge of methods of combating the pests which destroy his crops a necessary part of his equipment. In this course the student is taught to recognize the more common diseases of farm, garden, and orchard crops, and control measures are discussed in detail. Lectures are general, and in the laboratory opportunity is afforded for the handling and detailed examination of diseased plant materials. The course has a very practical application in modern agriculture. This course is given by the Department of Botany. Three lectures and two two-hour laboratory periods per week. Credits, 5.

Department of Botany

S–30. Drainage and Irrigation. (Second year, third term, elective.)

See S–30, Rural Engineering.

ANIMAL HUSBANDRY

Three courses in animal husbandry are required of all students, — one course in types and breeds of livestock, and two courses in feeding. An elective course in continuation is offered by the Department of Animal Husbandry in stock breeding, and a course in animal diseases is offered by the Department of Veterinary Science.

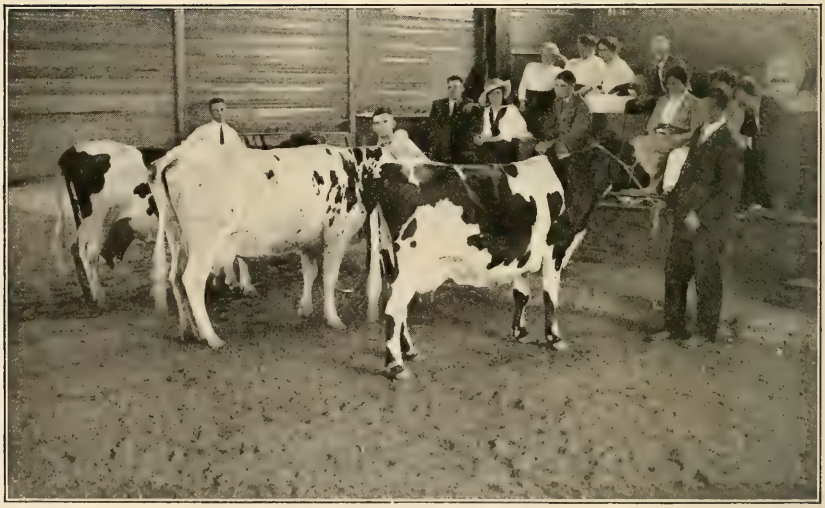
The department is equipped with an excellent laboratory, which has a seating capacity of 180 and which is fully adapted to the requirements. There are about 125 head of dairy cattle of various ages available for classroom work; among these are included superior representatives of the Jersey, Guernsey, Ayrshire, and Holstein breeds. There are flocks of pure-bred Shropshire and Southdown sheep of the best breeding and individuality. Considerable numbers of pure-bred Berkshire and Yorkshire pigs are maintained. The college possesses pure-bred Percherons and French coach horses, besides many work teams of different types, which are available for classroom purposes.

S–1. Types and Breeds. (First year, first term, required.)

This course is a study of the history of the various breeds of cattle, sheep, swine, and horses; their origin and development; their characteristics; and a discussion of the conditions to which each breed seems best adapted. The laboratory work will give the student an opportunity to do practice judging, which will familiarize him with animals of the different types and breeds. Textbook: Plumb, "Types and Breeds of Farm Animals." Three class hours and two two-hour laboratory periods a week. Credits, 5.

Assistant Professor Pontius

A view of one of the dairy laboratories



Short-course students judging stock

S–2. Principles of Feeding. (First year, second term, required.)

A study of the fundamental principles of animal nutrition; of the composition and quality of feeding materials and their relative importance for the different classes of farm animals. The latter part of this course will be devoted to a study of feeding standards and the calculation of rations. Textbook: Henry and Morrison, "Feeds and Feeding." Three class hours a week. Credits, 3.

Mr. Holden

S–25. Feeding and Management. (Second year, first term, required.)

This course will consist of a study of the feeding, care, and management of dairy cattle, swine, sheep, and horses, giving special attention to economic production. How to feed to get a large flow of milk, how to fatten, and how to grow breeding animals will receive proper attention. Prerequisite: "Types and Breeds," and "Principles of Feeding." Textbook: Henry and Morrison, "Feeds and Feeding." Three hours a week. Credits, 3.

Animal Husbandry Department

S–26. Animal Breeding. (Second year, second term, elective.)

A study of the principles involved in reproduction and improvement of farm animals; the laws of heredity and variation; the various methods of breeding, — in-breeding, line breeding, outcrossing, grading, and cross breeding; the importance of selection; and a discussion of the needs and possibilities of improvement. Prerequisite: "Types and Breeds," and "Principles of Feeding." Textbook: Mumford, "The Breeding of Animals." Three class hours a week. Credits, 3.

Animal Husbandry Department

S–27. Animal Diseases. (Second year, third term, elective.)

The aims of the course in animal diseases will be to give the student a knowledge of the structure and function of the various organs of the animal body, particularly those most liable to become involved in disease, and to acquaint him with the nature, causes, diagnosis, and prevention of the more common animal diseases, stress being laid upon those which are preventable by the adoption and practice of a judicious system of care and management. The lectures and textbook work will be supplemented by demonstrations with such clinical material as may be available. This course is presented by the Department of Veterinary Science. Three class hours a week. Credits, 3.

Dr. Paige

DAIRYING

Each student is required to take one general course in dairying.

Four courses in addition to the required course in dairying and allied subjects are available for the student during the second year of his work. These courses are designed for men who wish to give most of their time to animal husbandry and dairying. Students who are not particularly interested in dairy work are permitted to enroll only after consultation with the Director of Short Courses and the head of the department concerned.

The dairy work is given in Flint Laboratory, a modern building designed especially for dairy work and equipped with the newest and best types of dairying machinery.

The pasteurizing room contains a milk clarifier, cooler, and two two-hundred gallon vat pasteurizers. There is an ample and modern sterilizing outfit, and a large and very well-equipped refrigerating plant.

The room designed for cheese making contains double-jacketed vats, cheese mixer and draining racks, presses, etc. The butter-making room is well equipped with power and hand churns of various types, scales, and other accessories.

In the starter-making room there is a fifty-gallon double-jacketed vat, a one-hundred-gallon vat pasteurizer, a fifty-gallon starter can, and other smaller ones.

The separator room has a complete equipment of power and hand separators, milk heater, Babcock tester, sterilizer, etc.

The testing laboratory contains all necessary apparatus, both steam and hand, for Babcock testing, and individual apparatus necessary for each student.

S–2. Dairy — Milk Testing. (First year, second term, required.)

This course takes up the question of the importance of dairying in the United States, and especially in the New England States, giving the development of dairying from the earliest to the present time. It covers the secretion, composition, and properties of milk; reasons for variation in the per cent of fat in different samples of milk; the Babcock test for fat in milk and other dairy products; other common milk tests; and shows the advantage of testing herds, cow test associations, advanced registry work, etc. The laboratory work consists mainly in testing milk and dairy products for butter fat, solids, acidity, preservatives, etc. Two class hours and one three-hour laboratory period per week. Credits, 3.

Dairy Department

S–25. Dairy — Milk Products. (Second year, first term, elective.)

This course is mainly on soft cheese and ice-cream making, but includes some lectures on the manufacture of other milk products, such as artificial buttermilk, casein, condensed milk, milk powder, etc. It deals primarily with the up-to-date methods of making ice cream and various varieties of soft cheese, such as pimento, olive, nut, neufchatel, cottage, etc., and shows how a product of good quality can be made either as a means of marketing the entire milk supply or utilizing the surplus. Considerable attention is given to different methods of preparation for marketing. The laboratory work consists in the making of ice cream and various forms of soft cheese. Two class hours and one three-hour laboratory period per week. Credits, 3.

Dairy Department

S–26. Dairy — Market Milk. (Second year, second term, elective.)

This course takes up the history of market milk, its food value and use; attention is given to the necessary essentials in producing a clean product; the economics of milk production; the ad-

vantages of co-operative milk producers' organizations; the various methods of marketing milk; clarification; pasteurization; cooling, etc. The laboratory work consists in visiting dairy herds and city milk plants; the operation of machinery used in connection with market milk work. Two class hours and one three-hour laboratory period per week. Credits, 3.

Dairy Department

S–27. Dairy — Cream Separating and Butter Making. (Second year, third term, elective.)

This course covers the various methods of separating milk; the history, selection, care, and use of cream separators; the pasteurization and ripening of cream; testing of acidity in cream; the making and use of starters; a study of churns and churning; up-to-date methods of making butter; marketing butter, and tests for moisture and salt in butter. The laboratory work consists in the actual operation of separators and churns. Two class hours and one three-hour laboratory period per week. Credits, 3.

Dairy Department

S–29. Dairy Bacteriology. (Second year, second term, elective.)

Bacteria and other micro-organisms are the responsible agents for the changes which occur in milk and for the contagion which sometimes causes disease. They are found in milk at times when leaving the udder, they get in with the dust and dirt while milking, and they adhere to the dairy utensils which carry them over from one milking to the next. From the cow to the consumer there is the constant presence of these micro-organisms to contend with on the one hand and to foster on the other. All steps taken are significant in their control. The milking process, the handling of the cow, the condition of the milker, the cleansing of utensils, the management of the stable, and feeding, straining, aeration, cooling, clarifying, pasteurizing, — all are steps in the control of micro-organisms.

Many kinds of changes take place in milk, due to different kinds of micro-organisms. Many of these changes are sought, as the ripening of cream for butter, of milk for cheese, of milk for milk drinks; and many of these changes, also, are fought against, as ropy milk, sour milk, bitter milk, tainted milk, etc.

Micro-organisms of typhoid fever, scarlet fever, diphtheria, and others not infrequently find their way through the milk to the consumer, and produce epidemic forms of these diseases.

It is evident, therefore, that to handle milk and milk products safely it is desirable to know something of the agents which are the source of so much attention in the dairy. This indicates the nature of the substance of this course. This course is required of all students who elect dairying as one of their special lines of work. It is given by the Department of Microbiology. Three hours a week. Credits, 3.

Dr. Marshall and Assistants

A community market

FARM BUSINESS

Three courses dealing with farm business are required of all students: farm management, by Professor Foord of the Department of Farm Management and Farm Accounts; marketing of farm products, by Dr. Cance of the Department of Agricultural Economics; farm law, offered by Professor Hart of the Department of Agricultural Education; in addition, one elective course in agricultural credit is offered by the Department of Agricultural Economics.

S–26. Farm Management and Farm Accounts. (Second year, second term, required.)

A study of farming as a business; the correlation and adaptation of different farm enterprises, as dairy, orchard, poultry, to the specific farm. Land, labor, and capital requirements. Farm and building plans, and arrangements. The choice and purchase of a farm. Several laboratory periods will be devoted to practice in farm accounting. Farm experience is a prerequisite to this course. Three lectures and two laboratory periods a week. Credits, 5.

Professor Foord
Mr.————

S–27. Business Principles of Farming and Marketing Farm Products. (Second year, third term, required.)

The purpose of this course is to present the business side or economics of agriculture. It is based upon the principle that products are produced to sell, that the real object is to produce large money returns; the goal is the largest possible net profits with a given amount of land, labor, money, and equipment. The course deals with the possible types of profitable commercial agriculture in New

England; the present location of the most profitable farming sections; the choice of a farm; the necessary investment, and the proportion to invest in land, in improvements, in stock and equipment, and in reserves for labor and supplies, on different kinds of farms.

Another section of the course treats of the principles of farm credit. Who should borrow, sources of credit, mortgage credit, farm loan associations, land banks, personal credit, national bank loans, credit unions, terms of credit, and how to use credit profitably, are some of the topics studied.

Another division of the subject is marketing farm products. This will be treated in a very practical manner. The following are some of the topics: marketing as a part of production; outlets for the sale of farm products; principles of marketing; description of wholesale methods of distribution; middlemen, functions and abuses; methods of sale; prices of farm products; price quotations; government aid in marketing; direct marketing; co-operative buying and selling; methods of successful co-operation; farmers' exchanges in Massachusetts; how to organize successfully.

Each student will be required to select some principal product in which he is interested and make a careful study of its production, handling, and marketing on a profitable commercial scale. This course is given by the Department of Agricultural Economics. Lectures, textbook, original study, and report. Five class hours a week. Credits, 5.

Professor Cance

S–2. Farm Law. (First year, second term, required.)

The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper, and distinctions between personal and real property. Text, written exercises, lectures, and class discussions. Five hours a week. Credits, 5.

Professor Hart

S–30. Agricultural Credit. (Second year, third term, elective.)

This course aims to give a knowledge of the customary business practice in giving and obtaining credit, the principles governing the economical use of credit, the means by which the credit of the individual may be improved, and the present-day efforts to make capital available to farmers on more favorable terms.

Among the topics which will be discussed are the following: the use and abuse of credit; the nature and use of the various kinds of credit instruments; the advantages of the various sources of credit; causes of variation in the interest rate; co-operative credit societies; the work of the Federal land banks; lessons from the experience of other States and countries. Three hours a week. Credits, 3.

Mr. Sawtelle

POMOLOGY

Each student is required to take two courses in fruit growing. Three additional courses and a course in horticultural manufacture are provided for those who wish to make the study of fruit growing a specialty.

The Department of Pomology has 45 acres of orchard; two commercial vineyards, and a smaller one in which are shown the principal types of trellis and the leading methods of training grapes; several acres of small fruits, and nurseries where all of these various types of fruits are grown, in which students may see them in all stages of development; and a good equipment of orchard and nursery tools of all the principal types, enabling students to learn the value of each type. For orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples, plums, pears, and peaches, in natural colors. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States.

S–1. Fruit Growing. (First year, first term, required.)

This introductory course of the work in fruit growing will consist of a thorough study of the principal varieties of the different fruits. One of the most prolific causes of failure in the fruit business is the growing of wrong varieties; varieties requiring a dry soil are set in a wet soil; tender varieties are set in a wet soil or where only hardy ones should be used; quality, productiveness, and season of ripening

are ignored; and varieties are set which might be excellent in Ohio or Virginia or Missouri, but which cannot be grown profitably in Massachusetts.

This course aims to lay the foundation for a better state of things, and the student will be given a thorough drill on the leading varieties of the different fruits, and will have an opportunity to test personally many of the leading varieties, especially of apples. Two class hours a week. Credits, 2.

Professor Sears

S–2. Fruit Growing. (First year, second term, required.)

This course will deal with questions concerning the establishing and maintaining of fruit plantations.

It will include a full discussion of the choice of a site for the plantation. Many an orchard has failed simply because it was put in the wrong place; on another site on the same farm it might have been a conspicuous success.

The soil preferences of varieties of fruits will be considered so that the student may avoid setting Rhode Island greenings where Baldwins should be grown, or Spies where Hubbardstons should stand.

The culture of fruit plantations will be considered, and the comparative value of sod and cultivation presented. Each system has its advantages and disadvantages; what are they, and under what conditions should each system be used?

Orchard implements will be discussed, examined, and tested in order that the student may see for himself their good and bad points.

The question of cropping orchards will be discussed; whether it is best to grow corn and beans and potatoes in the orchard, or to allow the trees to use all the land.

This course is required of all students. Three class hours a week. Credits, 3.

Assistant Professor Drain

S–25. Fruit Growing. (Second year, first term, elective.)

This course will deal with the picking, packing, storing, and marketing of fruits. More men fail on these points than anywhere else in the fruit-growing business. There is a vast difference between good and bad cultivation or fertilizing of fruit plantations, but there is still more between good and bad picking or packing. The student in this course will have actual practice, so far as is possible, in the harvesting of all the fruits available in the college plantations. He will put these same fruits in storage and will later grade them and put them up for market. At the same time he will receive lectures on all phases of the subjects under consideration. Three class hours a week. Credits, 3.

Pomology Department

S–26. Fruit Growing. (Second year, second term, elective.)

This course will be devoted to a consideration of two special subjects connected with the care of fruit plantations, viz., pruning and spraying. The course is placed in this term because this gives the best opportunity for practical work along these two lines in the college orchards and plantations.

The pruning of all kinds of fruits will be studied, and wherever possible the students will be taken into the plantations and given an opportunity to perform the actual work.

Modern methods of spraying will be considered (with a very brief discussion of fruit pests), and the student will be trained in the preparation and application of the different sprays. Three class hours a week. Credits, 3.

Pomology Department

S–27. Fruit Growing. (Second year, third term, elective.)

While orcharding will always be the leading phase of the fruit business in Massachusetts there are many unusual opportunities for success in growing the various small fruits. This course will deal

Practical work in vegetable growing

Learning to grade and pack

with the problem of establishing and handling successfully plantations of strawberries, raspberries, blackberries, currants, gooseberries, and grapes, including such questions as the choice of varieties; the best types of soils; laying off and setting the plantation; the proper fertilizing; methods of pruning and training. The college has large plantations of most of these fruits so that the student will have ample opportunity for all types of practical work. Everything possible will be done to make the course of the utmost practical value, as well as to give the scientific principles on which our orchard practices are based. Three class hours a week. Credits, 3.

Pomology Department

HORTICULTURAL MANUFACTURES

S-25. Farm Manufacturing. (Second year, first term, elective.)

The utilization of the culls and low grades of fruits and vegetables is becoming a more important problem each year. Producers should be able to market their whole crop at a profit. The fundamental problems studied in this course will be: the manufacturing of apple products from cull apples, the canning and drying of vegetables, and the making of vegetable products.

Students will be required to manufacture a large number of fruit products, keeping an accurate cost of materials together with a record of methods used. The canning and drying of fruits and vegetables will be studied in detail, and methods illustrated through laboratory exercises. One lecture period and two laboratory periods per week. Credits, 3.

Professor Chenoweth

POULTRY HUSBANDRY

The course in poultry husbandry includes one required and three elective courses.

This department is well prepared to give practical instruction in poultry husbandry. Our quarters and equipment in Stockbridge Hall furnish us with ample laboratory facilities for careful studies in avian anatomy and physiology, identification and value of the various grains and feedstuffs used for poultry, the different grades and varieties of eggs and poultry, both fresh and storage, and other work of a highly technical character.

Our practical laboratory (poultry plant) comprises over 1,200 adult birds, divided into about 30 pens in various types of houses, the flocks varying in size from 10 to 200; two large incubator cellars containing a great variety of lamp and electric incubators, as well as two large mammoth machines; brooding facilities for 5,000 chicks, including a large open pipe brooder house for 1,200 chicks, and different kinds of brooders, stove, kerosene, and electric; laboratories for pen management; judging, culling, fattening, killing, picking, caponizing, compounding feeds, carpentry, etc.

In addition to the practical laboratory work actually done by the student he has an opportunity to keep under observation practical experiments and demonstrations that are being continually carried on for the benefit of students and practical poultrymen.

S-2. Introductory Course. (First year, second term, required.)

This course covers opportunities in poultry culture, geographical distribution, classes, breeds, and varieties, incubation and brooding, growing stock, diseases, marketing poultry and poultry products, feeding for egg and meat production, and poultry farm management.

Textbook: Lewis, "Productive Poultry Husbandry." Three class hours per week. Credits, 3.

Associate Professor Payne

S–25. Judging, House Construction, Feeds and Feeding. (Second year, first term, elective.)

This is an advanced course treating the following subjects: judging poultry for egg and meat production and exhibition purposes; poultry house construction; feeds and feeding; and management for egg production. The laboratory work supplementing these subjects will consist of a careful study of egg and meat type, score card, and comparison judging of fancy and utility poultry. Textbook: "The American Standard of Perfection." Two class hours and one two-hour laboratory period per week. Credits, 3.

Mr. Banta

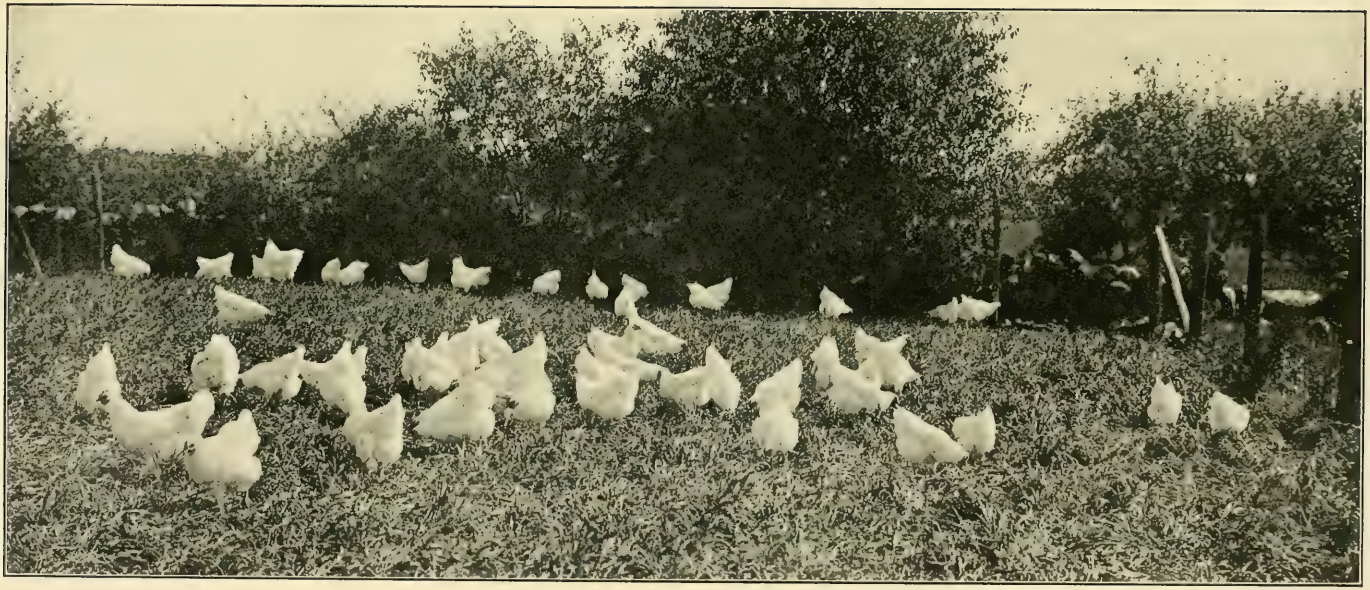
S–26. Poultry Production, Marketing, Incubation and Diseases. (Second year, second term, elective.)

This is a combination lecture and laboratory course, including the production of eggs for marketing and hatching purposes; production of broilers, roasters, capons, and methods of marketing poultry and poultry products; incubation; and the study of the common poultry diseases. The laboratory work will consist of a detailed study of the egg reports from the college and experiment station plants, and egg-laying contests, crate fattening, killing, picking, grading, and packing poultry. Two class hours and one two-hour laboratory period per week. Credits, 3.

Associate Professor Payne

S–27. Brooding, Breeding and Management. (Second year, third term, elective.)

A lecture course covering the theory of brooding, a careful study of the various types of modern lamp, coal stove, and mammoth



Raising poultry for profit

brooders. Breeding for egg and meat production will receive considerable attention in this course, including a careful study of the breeding records from our experimental flocks. Poultry farm management will be taken up from the standpoint of the beginner, including location of farm, amount of capital to invest, planning the poultry buildings, cost of equipment, operating expenses, and a study of labor income from poultry farming compared with other branches of agriculture. Textbook: Dryden, "Poultry Breeding and Management." Two class hours per week. Credits, 2.

Mr. Banta

S–30. Laboratory Course. (Second year, third term, elective.)

Incubation and brooding, including the operation of small incubators and observation on mammoth machines, keeping accurate records as to the cost of operation, operating brooders, and calculating the cost of rearing chicks to certain ages. One two-hour laboratory period per week. Credits, 1.

Mr. Banta and Mr. Cockell

RURAL ENGINEERING

Three courses are required of all students: a course in farm machinery, dealing with the care and use of tillage and harvesting machinery; a course in farm structure, including a study of the use of cement; and a course in shop practice. The department gives an elective course in drainage and irrigation. An elective course in motors, including gas engines and tractors, and an elective course in farm carpentry, are available to students.

The Department of Rural Engineering is located in Stockbridge Hall and in the Rural Engineering Building. Carpentry and forge work is done at the rural engineering shop, which is equipped with benches, forges, etc.

The equipment for farm machinery consists of a representative line of seed and tillage tools of the newest type. The work in farm motors is given in the rural engineering shop. Three stationary gas engines, four automobile motors, and five tractors are on hand all the time. Automobiles in need of repair are brought in to give students practice in the work of overhauling. The department possesses the machinery for doing practical work in concrete.

S–1. Farm Structures. (First year, first term, required.)

This course deals with the permanent farm improvements, including roads, fences, bridges, and buildings. The construction and maintenance of country roads are discussed, with special emphasis on the use of the road drag. The various types of fences and gates are studied and directions given for their construction. Practice is given in the making of concrete posts. Students are given practice in designing small culverts and bridges. The study of buildings relates

to the planning and designing of the various farm buildings. The location and arrangement of buildings are studied, with the view of getting a convenient and economical plant. The use of concrete is discussed and practice given in its use. Heating and lighting of buildings and water and sewage-disposal systems are given due importance. Students are given practice in drawing plans of buildings and estimating cost of construction. Two class hours and three two-hour laboratory periods per week. Credits, 5.

Professor Gunness

S–4. Farm Machinery. (First year, first term, required.)

This course is a study of the selection, use, and care of field implements, pumps, windmills, and miscellaneous farm equipment. Instruction is given by lectures, textbook and actual work on the implements in the shop and in the field. Special attention is given to the repair and maintenance of equipment. One class hour and two two-hour laboratory periods per week. Credits, 3.

Professor Gunness

S–2. Repair of Farm Equipment. (First year, second term, required.)

The object of this course is to give practice in the handling of tools, which will help in the repair of farm machines and miscellaneous farm equipment. Practice is given in forging, including drawing and shaping iron and steel, welding and tempering edge tools, and general blacksmith's repairing. Exercises also include pipe fitting, soldering, splicing rope, belt lacing, and babbitting and adjusting bearings. Practice is given in the use of machinist's tools, such as cold chisel, file, taps, and dies, drill press, and lathe. Two two-hour laboratory periods. Credits, 2.

Mr. Pushee

S–26. Carpentry. (Second year, second term, elective.)

This course gives practice in the care and use of carpenter's tools through bench work, repair of farm equipment, and building construction. Small buildings are erected by the students to give practice in all the phases of house construction. Practice is given in the building of forms and in the mixing and placing of concrete. Three two-hour laboratory periods per week. Credits, 3.

Mr. Pushee

S–27. Gas Engines. (Second year, third term, elective.)

This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing. One class hour and two two-hour laboratory periods per week. Credits, 3.

Professor Gunness

S–30. Drainage and Irrigation. (Second year, third term, elective.)

This course takes up the different methods of draining land, with practice in running levels, estimating sizes of tile and ditches, and installing drainage systems. The common irrigation systems are studied, giving special attention to the spray or overhead systems. This course is given by the Department of Rural Engineering. One class hour and two two-hour laboratory periods per week. Credits, 3.

Professor Gunness

VEGETABLE GARDENING

The equipment of the department is as follows: 10 acres of land devoted annually to the intensive production of all the vegetables commonly grown in Massachusetts; a large assortment of horse and hand garden tools; 500 linear feet of hotbeds and cold frames; 3,500 square feet of greenhouse space, devoted to the production of early vegetable plants and the maturing of lettuce, tomatoes, and cucumbers; classrooms and a well-equipped laboratory located in French Hall, a building of quite recent construction. An excellent collection of books on all phases of vegetable gardening are available in the college library.

To the young man who hopes to engage in the business of growing vegetables for market in Massachusetts there are offered three courses, — one in each term of the second year, — which afford instruction in the important details of this highly specialized type of horticulture. Upon his knowledge of these details and their careful observance will depend in large measure his success in the business. Among them may be cited: —

1. The types of soil best adapted to vegetable growing, and the best methods of handling them so that they may retain their proper texture and fertility while producing in some cases three crops in the same season; farm manures, green manures, cover crops, and commercial fertilizers; the best tools and methods of tilling the land and the practices of drainage and irrigation.

2. The cultural details of some twenty to thirty vegetables. These should include optimum soil and climatic conditions, proper dates and methods of seeding, transplanting and thinning, the best varieties of each to use under different conditions and for different

purposes; special details in their growth, such as pruning, training, tying, blanching, etc.; the control of injurious insects and diseases; and methods of harvesting, marketing, and storing the crops.

3. The construction and management of hotbeds, cold frames, and greenhouses, which are usually an adjunct to the production of vegetables in the open.

The training in vegetable gardening will combine, with a study of the principles underlying the art, the practical exercises intended to teach skill in performing the various operations. Ample opportunity is given for the latter in the greenhouses and gardens of the department.

S–25. Vegetable Gardening. (Second year, first term, elective.)

The work of this term will include a study of the different types of soils used in the production of vegetable crops, the classification of vegetables, and the cultural details of those grown as fall crops, with particular attention to harvesting, marketing, and storing. One class hour and two two-hour laboratory periods per week. Credits, 3.

Vegetable Gardening Department

S–26. Vegetable Gardening. (Second year, second term, elective.)

At this season of the year the practical work will naturally be such as can be carried on in the greenhouses. It will cover the construction and management of hotbeds, cold frames, and greenhouses, and the cultural details of the crops grown in them. In the classroom periods such subjects as farm manures, green manures, cover crops, commercial fertilizers, and the planning of the future season's operations will be considered. Two class hours and one two-hour laboratory period per week. Credits, 3.

Vegetable Gardening Department

S–27. Vegetable Gardening. (Second year, third term, elective.)

During this term actual operations of seed sowing, transplanting, cultivating, spraying, etc., will be performed with outdoor crops. The cultural details of the vegetables grown will be studied. Special attention will be given to the organization of a typical market-gardening business. One class hour and two two-hour laboratory periods per week. Credits, 3.

Vegetable Gardening Department

ENTOMOLOGY

The equipment for the work in entomology is perhaps not excelled in this country. The new fireproof building is well equipped with lecture rooms, libraries, and museums for the use of students. The department possesses a rapidly growing collection of insects. The laboratory is in excellent condition. The insectary of the M. A. C. Experiment Station is in the same building. A greenhouse, where plants infested with injurious insects are under observation and experimental treatment, is also open to students.

S–25. Insect Pests and their Control. (Second year, first term, required.)

This course is given as an introduction to a knowledge of insects in their relation to agriculture and to health. It takes up the most serious insect pests of our crops, treating of their life histories and habits as connected with methods for their control. Some of the insects included are the San José scale, oyster-shell scale, plant lice, squash bug, codling moth, peach borer, tent caterpillar, gypsy moth, brown-tail moth, European corn-borer, cutworms, fall webworm, asparagus beetles, apple-tree borer, wireworms, white grubs, the currant worm, etc. In addition, sufficient time will be given to insecticides and other methods for insect control to enable the student to prepare and use them intelligently. Consideration of some of the insects causing disease or otherwise injuring man or domestic animals will also be included in the course. This course is given by the Department of Entomology. Five hours per week. Credits, 5.

Professor Fernald

FLORICULTURE

The Department of Floriculture is housed in French Hall, a modern, well-lighted, and ventilated building. The department occupies two lecture rooms, one capable of accommodating 40 students, the other 90 students, and a large laboratory capable of accommodating 40 students at one time. In addition to these rooms the department has a specially prepared room for the storage of bulbous materials, a large general storage, soil, and fertilizer room.

The department is equipped with about 22,000 feet of glass, mainly devoted to the growing of roses, carnations, violets, sweet peas, chrysanthemums, and general bedding stock under commercial conditions, as well as a good collection of the ornamental plants found in private greenhouses.

A large perennial and annual garden of nearly 1,000 species and varieties is maintained for study by the students.

S–25, S–26, S–27. Floriculture. (Fall, winter, and spring terms of second year, elective.)

The courses are arranged to give the student a thorough foundation in the practical work of floriculture, with sufficient explanation of the scientific part of the work to enable him to understand the "why" as well as to know how to do the various operations.

During the course a study will be made of the methods of preparing soils, watering, ventilating, and fumigating greenhouses. Special attention will also be given to the propagation of plants, and particularly the main crops of the florist, such as roses, carnations, sweet peas, violets, chrysanthemums, bedding plants, annuals, and perennials.

Sufficient time will also be devoted to the study of greenhouse construction and heating problems to acquaint the student with the principles involved, and to enable him to plan intelligently for the building of the greenhouses and frames necessary to conduct the florist business.

The course will be made as practical as possible, and students will need a working outfit of overalls and jumper, as they will be required to learn to do by doing. One class hour and two two-hour laboratory periods per week. Credits, 3 per term.

Mr. Whiting

FORESTRY

The Department of Forestry has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc., a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing approximately 5,000,000 trees, transplants, and seedlings, is located on the college farm. Extensive forests, containing every variety of tree common to New England, are within walking distance of the college. The college campus affords an arboretum containing an exceptionally large number of trees not native to New England. The library contains complete sets of government bulletins, circulars, State reports, and all the best books on forestry subjects.

The Mount Toby State Demonstration Forest comprises approximately 750 acres along the line of the Central Vermont Railroad, between the stations of Leverett and Montague. It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration, and management. Improvement cuttings and cuttings for utilization are conducted by the Forestry Department, and every opportunity is offered the student to familiarize himself with the practical side of forest work.

S–25, S–26, S–27. Forestry. (Fall, winter, and spring terms, second year, elective.)

The course in forestry aims to give the student such training as will enable him to manage a woodlot for the production of posts, poles, ties, or lumber, and also to plant and care for trees for shade or decorative purposes.

Such topics as identification of tree species, nursery propagation, tree planting, tree surgery, woodlot management, timber estimating, logging, lumbering, and marketing will be taken up in sequence. Three hours a week. Credits, 3 per term.

Professor Clark

HYGIENE AND SANITATION

S–1. Hygiene and Sanitation. (First year, first term, required.)

Deviation from health, from the normal being, is disease. The human body is susceptible to deviation from health. Certain elements are responsible for the entrance of disease into the body. The body becomes weakened through exposure, lack of exercise, unsuitable food, abuses. Under such circumstances it lays itself open to attack. There is the attack from within, which consists of some organic derangement, and the attack from without, which makes it possible for foreign enemies, agents, or micro-organisms to enter.

Closely associated with the production of disease are intermediaries and causal factors, as ventilation, water supplies, sewage disposal, and food. They serve as vehicles for disease agents. The germs of disease find their way through them and are carried by them. Besides, human contact seems to be the most important disseminator, and insects and animals may harbor or convey and in some instances instigate disease.

Then there are those conditions which react on the body in a physical manner and influence its mechanism, its operating facilities, as mental disturbances, character of food, conditions of living.

It is the purpose of this course to discuss the nature of diseases, what causes them, the significance of sanitation and hygiene in preventing them, and the methods of control; in other words, to study, in the light of present knowledge, how to preserve health and prevent deviation from health. Three class hours a week. Credits, 3.

Dr. Marshall

ENGLISH

A fair command of written and spoken English is a very necessary part of the equipment of the practical farmer of today. Five credits in English are required of students in the Two-Year Course in Practical Agriculture. The work will give direct help to the student in preparation for the other subjects he is carrying in college, and also aims to give him control of the ordinary business and social forms. Those students who enter with sufficient preparation in English will be allowed to substitute electives for these two courses. A preliminary examination will be given to determine the students who may wisely be excused from the work in English. All students will be required to take this examination. Any student who shows by his work in other classes that he has need of further help in English will be enrolled in the English class, even if he has previously been excused.

S–1. English. (First year, first term, required.)

The first part of the course includes drill in the use of text and reference books, preparation of notes from readings and lectures, and a consideration of right and wrong methods of study. The second part of the course deals with composition, letter writing, business forms and usages. Three class hours a week. Credits, 3.

Miss Goessmann

S–2. English (First year, second term, required.)

This course will continue the work of the first term in composition, business forms, and usages. A study will be made of the elements of public speaking, parliamentary law, and practice. Two class hours a week. Credits, 2.

Miss Goessmann

FARM AND COMMUNITY PROBLEMS

Students enrolled in the Two-Year Course meet in a seminar once a week to discuss farm and community problems. Successful farmers, poultrymen, and fruit growers are asked to appear at these meetings to discuss practical problems that arise in connection with farm and community life. Attendance at these meetings is required.

An assigned course of reading with a written examination covering readings and lectures forms a part of this course. Each speaker will, at the conclusion of the lecture, answer questions on the topic presented. A list of dates and speakers will be given out when the student enrolls.

S–27. Social and Economic Problems. (Second year, third term, required.)

The purpose of this course is to acquaint the students with present-day problems of economics, sociology, and politics. The first part of the course will deal with general problems; during the second part a study will be made of the social, economic, and political aspects of rural community life. Readings, discussions, and written reports. Three hours a week. Credits, 3.

RURAL HOME LIFE

The farm and the farm home are a unit. It is impossible to consider one without the other. The growing interest in agriculture on the part of women is most encouraging. But even when women make a business of agriculture they are essentially home makers.

Is it not as vital for a woman to study the business of home management as to study the business of farm management?

If balanced rations are essential for the best growth and development of pigs, poultry, and cows, is it not as essential to understand the fundamental principles of feeding the family?

The woman farmer can be a far more useful member of the community if she has also studied the business of home making, the relation of the home to the community, the responsibility of the home maker as a consumer, the problems of healthy recreation and nutrition of the family. There is greater need than ever before for women to study the tasks that are essentially women's work.

It is with this in mind that the following courses are offered for women in the Two-Year Course in Practical Agriculture:

S–1. The Business of the Household. (First year, first term, elective.)

There are many efficient methods so successfully used in the business world which can be applied in the business of home making.

Since the home maker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equip-

ment, the use of time and labor saving devices. Three class hours per week. Credits, 3.

Professor Skinner

S–5 and S–27. Foods. (First year, second term, and second year, third term, elective for women.)

Every woman concerned with the welfare of her family is seeking to know how to vary her menus, to select food wisely, and to prepare it so that the greatest amount of nutriment may be saved.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods, and planning meals for efficiency and economy.

Balanced menus are not vague and mysterious, but result from the application of a few fundamental principles. Many people are underfed, not from a lack of food but from an unwise choice.

Consideration will be given also to such special problems as infant feeding and school lunches.

This course will include laboratory work of practical value.

We are pleased to announce that a very attractive laboratory has been newly equipped for this work. Two two-hour laboratory periods and one lecture per week. Credits, 3.

Professor Skinner

S–29. Home Nursing. (Second year, second term, elective for women.)

It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of the family health.

However, every home maker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured. Three class hours per week. Credits, 3.

Home Economics Department

S–31 and S–33. Clothing. (Second year, first and third term, elective for women.)

An important problem in the home to-day is the selection of suitable fabrics; therefore their character, cost, and durability are studied with reference to planning a wardrobe for a limited income.

Consideration will also be given to the principles of design, appropriateness, and simplicity in dress to develop good taste.

There will be practical work in sewing and making garments. Recently a very attractive laboratory for sewing has been equipped adequately for this work. One class hour and two two-hour laboratory periods. Credits, 3.

Home Economics Department

SHORT COURSES AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

This bulletin describes the work of the Two-Year Course, and a brief statement is made of the other short courses.

Short courses have been maintained by the Massachusetts Agricultural College for a number of years. They have made a universal appeal, proving attractive and valuable to experienced farmers and farm women, to college graduates who wished to know more about the science of agriculture, to young men and young women who expect to be engaged in farming, to teachers, club workers, and ministers. Short courses open the door of opportunity for busy men and women who wish to increase their efficiency and earning power. The aim of short course work is not to provide preparatory or elementary instruction, but to afford the largest amount of information and training in agricultural lines in the shortest possible time.

In this State there are thousands of young men and young women who are to become future farmers, orchardists, poultry producers, dairy men and women. It is to the interest of both the individual and the State that these young men and young women keep pace with the rapid development of agriculture. There are also many mature men and women well past the usual school age who desire to acquaint themselves with the more recent developments in agricultural science and practice. It is to meet these needs that short courses are offered.

Information in regard to any of the short courses may be obtained from the college. Short courses include, in addition to the Two-Year Course in Practical Agriculture, the One-Year Vocational Poultry Course, the One-Year Course in Rural Engineering, the Summer School, and the Winter School. A description of these courses is given in the following pages.

A ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY

J. C. Graham, Loyal F. Payne, Luther Banta, *Instructors*

This course is designed for graduates of the agricultural vocational schools and others who wish to take a truly vocational course and can spend one year only at college. This course, beginning when college opens in the fall and extending through the college year, is limited to 12 students.

The institution of this One-Year Vocational Course in Poultry Husbandry is to meet the needs of those who wish to specialize in this branch of agriculture and who feel they cannot spend either two or four years in doing it. This course is intermediate between the college course and the ten weeks' short course, and is designed to prepare the student for practical poultry keeping, either for pleasure or for profit. "Learn to do by doing" is our motto. A more or less detailed outline is given below, and the general plan is as follows: the student devotes all his time to poultry work from the opening of college to January 1, at which time he drops all poultry courses except Course 1 and takes about 15 credits in Course 6. From the close of the winter short course, about March 19, until college closes, he again devotes all his time to poultry work. As will be seen, the short course brings the student in contact with other members of the faculty and acquaints him with important correlated work. As the class is limited to 12, it will be well for those who wish to take advantage of it to apply at once.

Course of Study

Course 1. Elementary Poultry Keeping. — A textbook course supplemented with lectures, recitations, etc., covering the entire field of elementary poultry keeping, special emphasis being laid upon the following subjects: opportunities in poultry keeping, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock and poultry diseases. Five recitations per week throughout the year.

Course 2. — A practical laboratory course covering the following subjects: carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, making and applying disinfectants and lice powder, also identification and study of poultry feeds, etc. Two laboratory periods per week from October until December, inclusive.

Course 3. Poultry Judging. — Fall term. "The Standard of Perfection" will be used as a textbook. Two two-hour laboratory periods.

Course 4. — A practical laboratory course in incubation, brooding, and growing stock, equivalent to five laboratory periods per week from March to June, inclusive.

Course 5. — A conference, observation, and general reading course equivalent to one or two recitations per week during the fall and spring terms. In this course the student will become thoroughly acquainted with the best literature on poultry subjects through books, station bulletins, scientific articles, poultry magazines, etc. A thorough discussion of the problems met by the practical poultryman is a strong feature of this course.

Course 6. Supplementary Courses. — Each student shall select from the winter short course enough of the following subjects to give him at least 12 to 18 credit hours: pomology, soils, agronomy, beekeeping, market gardening, animal husbandry, farm management, dairying, etc.

Course 7. Poultry Management. — A general poultry prac-

tice course in the care and management of poultry, the work to be done morning, noon, and night, and other periods as necessity requires, the class to be responsible for the work in caring for specified flocks, under the supervision of instructors, from October until December, inclusive, and from March until college closes.

Entrance Requirements

Applicants must be at least eighteen years of age and have a good elementary education.

Fees

There is no tuition for residents of Massachusetts, but a laboratory fee of $5 is required for the fall term and the same for the spring term.

For further information concerning this course, write Poultry Department.

THE SUMMER SCHOOL

The Four Weeks' Summer School for 1919 was under the joint direction of the college and the Massachusetts Board of Education. Instruction was provided in the following: —

Agriculture
- Soil Fertility
- Animal Husbandry
- Breeds and Live Stock Judging
- Dairying
- Poultry Breeding and Management
- Farm Machinery and Gas Engines

Horticulture
- Fruit Growing
- Fruit Growing for Teachers (two weeks)
- Vegetable Gardening
- Trees and Shrubs
- Food Preservation
- Food Preservation (two weeks)
- Amateur Home and Flower Gardening

Home Life and Practical Arts
- Foods
- Elementary Dietetics
- Home Management
- Clothing Efficiency (beginners)
- Clothing Efficiency (advanced students)
- Vocational Methods

Education
- School Management
- Rural School Curriculum
- Primary Reading

Education — Con.
- Upper Grade Reading
- Primary Language
- Arithmetic
- Geography
- History
- Penmanship
- Organized Play and Recreation
- Plays and Pageantry (two weeks)
- Hygiene and Sanitation
- Home and School Garden Supervision
- Oral English and Parliamentary Practice (two weeks)
- Junior Extension Club Work (by arrangement)
- Design and Practical Arts

Vocational Agricultural Teaching
- Principles and Methods of Teaching Agriculture
- Principles and Methods of Teaching Vocational Agriculture
- Professional Improvement Problems

Related Subjects
- Insect Life
- Plant Diseases (two weeks)
- Native Ferns (two weeks)
- Bird Life
- Rural Sociology
- Plant Life (two weeks)

The enrollment was the largest in the history of the college.

VOCATIONAL COURSES FOR MEN DISABLED IN MILITARY SERVICE

The college organized and maintained during the summer special courses in agriculture, horticulture, poultry husbandry, and gas engines, for men disabled in the military service of their country. These men were sent to the college for instruction by the Federal Board for Vocational Education. Provision for the further instruction of these men is being made through the Two-Year Course and such special vocational courses as the needs of the men may require in fitting them for successful farm life.

The following special short course in rural engineering will be offered during 1919–20. This course is designed for men who wish to specialize in the study of farm machinery. It is open to every one seventeen years of age or over who has completed a common school education.

First Term		*Second Term*		*Third Term*	
Gas Engines	5	Gas Tractors	5	Gas Tractors	5
Farm Machinery	3	Forge Shop	2	Forge Shop	2
Mechanical Drawing	3	Farm Accounts	2	Farm Management	3
Vocational Mathematics	2	Vocational Mathematics	2	Vocational Mathematics	2
Elective.		Elective.		Drainage and Irrigation	3
				Elective.	

NOTE. — A class in English will be organized for students who wish instruction in this branch.

It is expected that a course in applied physics will be offered throughout the year.

Electives must be selected from the two-year course in practical agriculture to bring the total number of hours up to 20 per term, but not to exceed 26.

THE WINTER SCHOOL

The Winter School is intended for young and old who wish to avail themselves of a short period of intensive training along agricultural lines. This school has been established for a number of years at the college, and has proved to be very popular with farmers, their wives, sons, and daughters, teachers, college graduates, and others. This school begins December 29. It offers instruction in the following: —

Group A. General Agriculture

- Soil Fertility
- Field Crops
- Types and Breeds of Live Stock
- Live Stock Feeding
- Animal Breeding
- Dairying
- Dairy Bacteriology
- Animal Diseases
- Poultry Husbandry

Group B. Horticulture

- Fruit Growing
- Market Gardening
- Floriculture
- Horticultural Manufacture

Group C. Farm Business

- Farm Management
- Farm Accounts
- The Supply and Marketing of Farm Products in Massachusetts
- Sources and Use of Agricultural Credit

Group D. Related Subjects

- Botany
- Entomology
- Farm Mechanics
  - Gas Engines
  - Tractors
- Rural Sanitary Science
- Citizenship (special lectures)

Group E. Homemaking

- Foods and Conservation
- Home Nursing
- Clothing

Group F. Vocational Agricultural Teaching

COURSES FOR SOLDIERS AND SAILORS

During 1918–19 two six-weeks courses for soldiers and sailors were organized and offered by the Massachusetts Agricultural College. The first began February 10 and closed March 22; the second began April 14 and closed May 24. Instruction was offered in the following: —

Fruit Growing	Soils and Crops
Animal Husbandry	Dairying
Farm Machinery	Poultry Husbandry

These courses will not be offered during 1919–20 in view of the fact that the other short courses maintained by the college will be in operation to take care of men discharged from military service who may wish instruction in agriculture.

DIRECTORY OF INFORMATION

A. The College

Those desiring college catalogues, the President's annual report, and other pamphlets giving full information relative to entrance requirements, courses of study, expenses, opportunities for student labor, and so forth, should address Ralph J. Watts, Secretary, Amherst, Mass.

All questions regarding admission to the college, either to the freshman class or to advanced standing, should be addressed to Prof. P. B. Hasbrouck, Registrar, Amherst, Mass.

B. The Experiment Station

The Experiment Station conducts investigations in as many lines of agricultural science and practice as its funds will permit. It has charge of the inspection of commercial fertilizers, commercial feeding stuffs, and milk-testing apparatus. Branch stations in cranberry and asparagus culture are maintained in other sections of the State.

The station considers the farmers' problems to be its problems, and desires to keep in touch with them.

Requests for bulletins reporting the results of experiments and inspections, and for other information on the work of the station, should be addressed to Fred W. Morse, Acting Director of the Experiment Station, Amherst, Mass.

C. The Graduate School

Questions relating to courses offered leading to the degrees of Master of Science and Doctor of Philosophy, admission and work required, should be addressed to Dr. Charles E. Marshall, Director of the Graduate School, Amherst, Mass.

D. The Extension Service

Inquiries of a general nature regarding the work of the Extension Service, extension publications, or requests for new lines of work should be addressed to Ralph W. Redman, Acting Director of Extension Service, Amherst, Mass.

E. Short Courses

For information concerning the Short Courses, the Two-Year Course in Practical Agriculture, the Ten Weeks' Winter School, the Summer Schools, write or apply to John Phelan, Director of Short Courses, Amherst, Mass.

The first class, 1918

TWO-YEAR COURSE, 1918-19

Anderson, Walter R.	East Pepperell	13 Phillips Street
Bailey, Ruth M.	Needham	116 Pleasant Street
Bartlett, John H., Jr.	Nantucket	Mount Pleasant
Boal, William M.	Boston	15 Phillips Street
Brady, Benjamin	Greenfield	Mount Pleasant
Burns, Timothy F.	Cambridge	3 Nutting Avenue
Burrington, Reginald	North Amherst	North Amherst
Butts, Edith	New York, N. Y.	4 Nutting Avenue.
Clapp, Horace D.	Easthampton	8 Kellogg Avenue
Clark, Elbridge T.	Millis	75 Pleasant Street
Crane, Reginald	New York, N. Y.	16 Nutting Avenue
Davis, Frederick O.	Windsor, Vt.	45 Pleasant Street
Davis, Mary G.	Weston	120 Pleasant Street
Day, Roland W.	Medfield	83 Pleasant Street
Dibble, Benjamin F.,	East Haven, Conn.	21 Fearing Street
Fine, Samuel	Attleboro	8 North College
Forbes, Rose R.	Jamaica Plain	North Amherst
Frary, Frank T.	Southampton	8 Kellogg Avenue
Gagnier, Christopher I.	Springfield	77 Pleasant Street
Graves, Reginald S.	Bridgeport, Conn.	15 Phillips Street
Gushee, Roger H.	Ludlow	75 Pleasant Street
Hamilton, Sumner P.	Bolton	13 Phillips Street
Hawes, Leon R.	Sudbury	35 East Pleasant Street
Hill, Grace M.	Amesbury	44 Pleasant Street
Hollingsworth, Leonard	Siasconset	120 Pleasant Street
Kirchner, Robert W.	Pittsfield	Mount Pleasant
Kramer, Israel	Lynn	16 Nutting Avenue
Landstrom, Oscar N.	Heath	5 Nutting Avenue
Porrovecchio, Carl J.	Charlemont	5 Nutting Avenue
Power, John F.	Millis	75 Pleasant Street
Prescott, Alice B.	Jamaica Plain	Draper Hall
Prouty, Stanly B.	Furnace	7 Nutting Avenue
Reid, Howard S.	Franklin	15 Phillips Street
Rivera, Galo	Caycy, Porto Rico	The Davenport
Rowe, Elliot E.	Bolton	13 Phillips Street
Segelman, Max	Chelsea	9 Fearing Street
VanDerpoel, Ernest C.	Chicopee Falls	35 East Pleasant Street

APPLICATION FOR ENROLLMENT

IN THE

TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

OFFERED BY THE

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST

Name_____

Date of Application_____

Post Office_____ Street_____ State_____

Present Occupation_____

Previous Education_____

Finished Elementary Schools at_____

High School number of years_____ Where_____

College_____ Where_____

Farm Experience. Number of Years_____ Type of Farm_____

Reference_____
Name Address

Name and address of person to notify in case of illness or accident:

_____

Mail this blank to John Phelan, Director of Short Courses, Massachusetts Agricultural College.

THE M. A. C. BULLETIN

Amherst, Mass.

Volume XI NOVEMBER, 1919 Number 7

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

THE TEN WEEKS' WINTER SCHOOL

1919-1920

THE M. A. C. BULLETIN Vol. XI, No. 7.

The Ten Weeks' Winter School

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE

CALENDAR

1919–1920

December 30, Tuesday, 8 A.M., ... Term begins

March 5, Friday, 5 P.M., ... Term closes

Published eight times a year by the Massachusetts Agricultural College, January, February, March, May, June, September, October, November
Entered as second-class matter at the post office, Amherst, Mass.
Accepted for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 3, 1918

BOSTON
WRIGHT & POTTER PRINTING CO., STATE PRINTERS
32 DERNE STREET
1919

Publication of this Document
approved by the
Supervisor of Administration.

A view of the campus.

FACULTY, 1920

KENYON L. BUTTERFIELD, A.M., LL.D.
President of the College

EDWARD M. LEWIS, A.M.
Dean of the College

CHARLES H. PATTERSON, A.M.
Assistant Dean of the College

JOHN PHELAN, A.M.
Director of Short Courses

	DEPARTMENT
MAX F. ABELL, B.Sc. *Assistant Professor of Farm Management*	Farm Management
ARTHUR B. BEAUMONT, Ph.D. *Professor of Agronomy*	Soil Fertility
ALEXANDER E. CANCE, Ph.D. *Professor of Agricultural Economics*	Agricultural Economics
WALTER W. CHENOWETH, A.B., M.Sc. *Professor of Horticultural Manufacture*	Horticultural Manufacture
HERBERT P. COOPER, M.Sc. *Assistant Professor of Agronomy*	Field Crops
ARTHUR L. DACY, B.Sc. *Associate Professor of Vegetable Gardening*	Vegetable Gardening
A. LAWRENCE DEAN *Instructor in Poultry Husbandry*	Poultry Husbandry
HENRY T. FERNALD, Ph.D. *Professor of Entomology*	Entomology
JAMES A. FOORD, M.Sc.Agr. *Professor of Farm Management*	Farm Management

	DEPARTMENT
Christian I. Gunness, B.Sc. *Professor of Rural Engineering*	Rural Engineering
Margaret Hamlin, B.A. *Adviser*	Agricultural Courses for Women
William R. Hart, A.M., LL.B. *Professor of Agricultural Education*	Agricultural Education
Franklin E. Heald, M.A. *Agent for Agricultural Teacher-Training, Massachusetts Board of Education*	Vocational Agricultural Education
Richard L. Holden, B.Sc. *Instructor in Animal Husbandry*	Animal Husbandry
Edgerton G. Hood, B.Sc.Agr. *Instructor in Microbiology*	Microbiology
William P. B. Lockwood, M.Sc. *Professor of Dairying*	Dairying
Frederick A. McLaughlin, B.Sc. *Instructor in Botany*	Botany
John C. McNutt, B.Sc.Agr. *Professor of Animal Husbandry*	Animal Husbandry
Charles E. Marshall, Ph.D. *Professor of Microbiology*	Microbiology
James B. Paige, B.Sc., D.V.S. *Professor of Veterinary Science*	Veterinary Science
Loyal F. Payne, B.Sc. *Associate Professor of Poultry Husbandry*	Poultry Husbandry
William S. Regan, Ph.D. *Associate Professor of Entomology*	Entomology
Victor A. Rice, B.Sc. *Assistant Professor of Animal Husbandry*	Animal Husbandry
Fred C. Sears, M.Sc. *Professor of Pomology*	Fruit Growing

	DEPARTMENT
EDNA SKINNER, B.Sc. *Professor of Home Economics*	Home Economics
JAMES L. STRAHAN, M.S. *Assistant Professor of Rural Engineering*	Rural Engineering
CHARLES H. THAYER *Instructor in Agronomy*	Agronomy
CLARK L. THAYER, B.Sc. *Associate Professor of Floriculture*	Floriculture
STANLEY E. VANHORN *Instructor in Dairying*	Dairying
GILBERT S. WATTS, B.Sc. *Instructor in Vegetable Gardening*	Vegetable Gardening
WINTHROP F. WELLES, B.S. *Professor of Agricultural Education*	Agricultural Education
FRED E. WHEELER, B.S. *Instructor in Dairying*	Dairying
JAMES WHITING *Foreman, Department of Floriculture*	Floriculture

CHARLES R. GREEN, B.Agr.
Librarian of the College

THE TEN WEEKS' WINTER SCHOOL

Dec. 30, 1919, to March 5, 1920

Purpose

The Ten Weeks' winter school at the Massachusetts Agricultural College is designed for those classes of students who cannot afford to spend a longer time in resident study, and yet who wish to become familiar with the theory and practice of agricultural science.

The courses offered in the winter school are not preparatory or elementary in their nature, but are practical throughout.

The experience of a number of years has shown that the needs of the following groups of students must be met by the winter school: —

First. — Farmers and their wives, well past the usual school age, who wish plain, practical, direct instruction that may be used in everyday life on the farm. The courses in the winter school are planned for men and women who have had practical farm experience, and who wish to supplement this work with a period of study.

Second. — Young men and women who control or manage a farm, or who expect to be engaged in some phase of agricultural work.

Third. — Students who desire to specialize in some particular line of work, as, for example, dairying.

Fourth. — College graduates, professional men, etc., who, for one reason or another, wish to know more about the business of farming.

Fifth. — Women students. The number of women students electing agricultural courses has been steadily increasing from year to year. Many also take advantage of the opportunities offered by the winter school for courses in homemaking. These women students fall into three groups, provision being made for each group: first, those women who desire only agricultural subjects; second, those who wish instruction in homemaking only; and third, those who plan to take a combined course.

Agricultural Opportunities for Women

Women succeed increasingly in work upon the land. Modern science, labor-saving methods, and a good agricultural education constantly enlarge their field of opportunity and increase their chance of success. Agricultural training offers possibilities to many classes of women. The opportunity of the woman who lives in the country — the farmer's wife or daughter — is particularly good. Her knowledge of country life and farm ways is a distinct asset. Agricultural training will enable her while still living at home to increase her income in various ways, or to start an enterprise, which, if she desires, she can gradually develop upon a large scale. The business woman, the teacher, and the woman who spends part of her year in the country will find that farming offers a variety of interests and work that may be used for profit as well as pleasure. Women are farming independently in nearly every branch of agriculture in which there are favorable openings for them, as in general farming, stock or dairy farming, poultry raising, fruit raising, vegetable growing, floriculture growing. Paid positions are open to women in nearly all branches of farming. These positions range from those of farm workers to farm managers. The pay varies according to the nature of the position, and to the training, experience, and ability of the worker. Women who are interested in agricultural courses should correspond with Miss Margaret Hamlin, who acts as Adviser in Agricultural Courses for Women.

Instruction

The instruction is given by the regular faculty by means of classroom teaching, laboratory exercises, and practical work. The work of the classroom is supplemented by demonstration work in the laboratory, dairy room, greenhouse, and stables. The library of 60,000 volumes offers exceptional opportunities for special study in agriculture, horticulture, and related sciences. The instruction is

designed to offer plain, practical, direct information, and to establish the underlying reasons as well as the method employed in the various operations.

Entrance Conditions

There are no entrance examinations or conditions other than that students shall be at least eighteen years of age and have completed the elementary or common schools.

Students are advised to review their arithmetic before coming in for the winter session.

Tuition, Fees, and Expenses

There is no tuition in the winter school, but each student is required to pay to the treasurer a $5 registration fee. There are no laboratory fees in connection with any of the courses.

Board may be obtained at the college dining hall for approximately $6.50 a week. Rent for furnished rooms in private houses varies in price from $2.50 to $4 a week for each occupant.

How to Enroll

Plan to arrive in Amherst so as to register not later than Tuesday, December 30.

Upon arrival report at the office of the Director of Short Courses, located in South College, telephone 424 R, where information may be obtained in regard to board and room, schedule of classes, etc.

Make out the application for enrollment, which will be supplied by the Director of Short Courses. This enrollment may be made out in advance by correspondence. Students who expect to take the courses are advised to correspond with the Director of Short Courses.

Present the application for enrollment at the office of the registrar, who will issue a class card that must be signed by (1) the registrar, (2) the treasurer, (3) the Director of Short Courses, and (4) the instructors in whose classes the student enrolls.

Go to the treasurer's office to pay the registration fee.

Return the enrollment card *within three days* to the office of the registrar. The card should have the signatures stated above.

Classes

Classes begin Tuesday, December 30, at 8 A.M.

Regularity of attendance and conformity to general college ru'es is required of all winter school students.

Information in regard to books used in the various courses will be given by the instructors at the first meeting of the class. The necessary textbooks may be purchased at the treasurer's office.

Students are advised to elect not less than twelve nor more than twenty-four hours per week. All variations from this rule must be approved by the Director of Short Courses. The choice of subjects rests with the student.

General Exercises

On Wednesday afternoon an assembly is held at which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. Attendance is required.

Rules and Regulations

As a guide to those who come to the college for the first time the following extracts are taken from the regular rules of the college: —

The customary high standard of college men in honor, manliness, self-respect, and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend but also to name conditions under which students may remain in the institution.

Schedule of Classes

A schedule of classes may be had from the Director of Short Courses by December 15. Students are advised to write for a copy of this schedule and to make plans for their work in advance.

Positions

While the college does not guarantee positions it frequently has calls for capable, energetic men and women with farm experience. The demand for students to fill positions has been greater than the supply. The opportunity for farm positions is exceptionally good.

The Library

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 60,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 6 P.M. and 7 to 9.30 P.M. every week day, and from 9 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find splendid material for

their line of college work and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

The Infirmary

The college maintains an infirmary for the care of sick or injured students. Students are urged to go to the infirmary when in need of the services rendered by the resident nurse or by a physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that students will go to the infirmary at his suggestion.

The infirmary fee is $1.50 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights.

Scholarships

The Jewish Agricultural and Industrial Aid Society of New York instituted in 1908 a system of free scholarships to enable the children of Jewish farmers to attend the short winter courses offered by the agricultural colleges in the States in which they reside. The scholarships are awarded by competition, which consists in the writing of a brief essay on an agricultural topic. Children of Jewish farmers living and working on the farms of their parents are eligible to compete for these scholarships.

Applications for these scholarships should be made to The Jewish Agricultural and Industrial Aid Society, 174 Second Avenue, New York City.

The New England Branch of the Woman's National Farm and Garden Association is offering this year $500 in scholarships, available to women electing agricultural courses.

Applicants for these scholarships should communicate with the Committee on the Award of Scholarships, Woman's National Farm and Garden Association, 4 Joy Street, Boston, Mass.

DESCRIPTION OF COURSES

A. GENERAL AGRICULTURE

1. Soil Fertility

A course in which the origin of soils, their properties and management, will be studied. Emphasis will be placed on: the control of soil moisture; tilth and tillage; importance and maintenance of soil organic matter; manures, their composition, value, preservation, and use; and the properties and use of commercial fertilizers. Three lectures a week.

Professor Beaumont

2. Field Crops

The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work gives the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. Course 1 required. Two lectures and one two-hour laboratory period a week.

Assistant Professor Cooper

3. Types and Breeds of Livestock

Outlines of the market classes and grades of beef cattle, horses, sheep, and swine, placing emphasis upon the characteristics of each class and its adaptations. The characteristics, the adaptations, and so far as is possible the historic development of each of the more important breeds of livestock are also carefully studied, as well as their distribution in America. Special emphasis is laid upon dairy cattle and horses in the judging work. Three lectures and two two-hour judging periods a week.

Professor McNutt

Fertilizer mixing

Tractors at work

4. Livestock Feeding

A study of the physiology of nutrition, the composition of feedstuffs, and of rational economic feeding. The feeding of dairy cattle and their management for profitable milk production receives first attention. Similarly, the feeding of horses, of beef cattle, of sheep, and of swine is studied. Three lectures a week.

Professor McNutt

5. Animal Breeding

A discussion of the more common problems pertaining to the breeding of livestock, their explanation and solution; in-breeding; cross-breeding; grading. The work of the most successful men in history is studied. Time is given to the study of pedigrees of the different breeds of dairy cattle and other stock. One lecture and one two-hour laboratory period a week.

Professor McNutt

6. Dairying

(*a*) Testing milk and milk products: composition and properties of milk, Babcock test for fat, tests for acidity; moisture and salt in butter. Two lecture hours, one two-hour laboratory period.

(*b*) Manufacturers: study of separators, separating, ripening cream, making starters, making butter, and making cottage cheese and other soft cheese. Two lecture hours, two three-hour laboratory periods.

(*c*) Market milk: a study of market milk conditions, production, care and handling; various types of dairy buildings. One lecture hour, one two-hour laboratory period.

(*d*) Dairy arithmetic: problems of the dairy. One two-hour laboratory period.

Dairy Department

NOTE. — Dairy students are required to take (*a*), (*b*), (*c*), and (*d*), also the course in dairy bacteriology; (*a*) only, open to other students.

7. Dairy Bacteriology

The characteristics and functions of bacteria and their relation to the different branches of the dairy industry. The scientific basis for cream ripening, sterilization, pasteurization, control of fermentation, and the production of the best quality of market milk. Two lectures and one two-hour laboratory period a week.

Professor Marshall

8. Animal Diseases and Stable Sanitation

Lectures upon some of the common diseases of livestock, giving special attention to methods of prevention, care, and sanitation; the treatment of emergencies and accidents; how to keep animals healthy. Two lectures a week.

Professor Paige

9. Poultry Husbandry

The course consists of lectures on opportunities in poultry culture, poultry house construction, winter egg production, incubation and brooding, feeds and feeding, and the most popular methods of marketing poultry and eggs in Massachusetts. The laboratory work will consist of demonstrations and practical work in killing, picking, caponizing, judging fowl for egg production, and studying types and construction of incubators and brooders. Our equipment enables us to demonstrate various methods of housing and feeding. Practical work in operating incubators is given to as many as can be accommodated. Five lectures and one two-hour laboratory period per week.

Mr. Dean

B. HORTICULTURE

10. Fruit Growing

This course deals with the practical side of the growing and marketing of fruits. Especial attention is given to such questions as selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing. Lectures, supplemented by demonstrations, and whenever possible, actual work by the student. Students electing Fruit Growing are also required to take Course 1, and it is recommended that they take Courses 18 and 19. Three lectures and one two-hour laboratory period a week.

Professor Sears

11. Market Gardening

This course is designed to acquaint the student with the business of market gardening as conducted in New England. It will consist of lectures, textbook assignments, and laboratory exercises. The course will be divided into three principal groups: (A) the characteristics of the market gardening business from the standpoints of capital required, location, markets, site, area, soils, and other fundamentals; (B) the application of general agricultural principles to the market gardening business; and (C) market garden crops in detail, with systems of production, in so far as the time will allow. Class limited to 30. Students electing market gardening are required to take Course 1, and it is recommended that they take Courses 18 and 19. Three lectures and two two-hour laboratory periods a week.

Associate Professor Dacy

12. Floriculture

This course is designed to furnish those who have not the time to devote to a longer course with the theoretical and practical considerations essential to success in floricultural work. The course covers as

Class work in the greenhouses

Winter school students pruning trees

thoroughly as time will permit those aspects of the work which are of especial interest to the commercial florist. Some of the topics considered are greenhouse construction, greenhouse management, and methods used in growing important commercial crops. A portion of the course will also be devoted to a consideration of gardening and garden flowers. Special trips are taken to study floricultural establishments in the State; students desiring credit for the course are required to take these trips. Students electing this course will also be obliged to take Courses 1, 18, and 19. Five lectures a week; field trips on Saturday.

Associate Professor Thayer and Mr. Whiting

13. Horticultural Manufacture

A practical course in food preservation dealing primarily with fruits and vegetables. The canning of fruits and vegetables as practiced in the home and in community and small commercial plants. The evaporation of fruits and vegetables. The various types of equipment and methods of preparation. The manufacture of (*a*) fruit products, such as jams, jellies, butters, fruit juices, vinegar, pastes, etc.; (*b*) vegetable products, as pickles, piccalilli, sauerkraut, catsup, etc. A study of storage conditions as applied to fruits, vegetables and manufactured products. Two lectures and two laboratory periods a week.

Professor Chenoweth

C. FARM BUSINESS

14. Farm Management

A study of some of the problems of modern farming and the factors that influence success, such as the choice of a region and of a farm, types of farming, size of farm, rotation of crops, and labor problems. Two lectures a week.

Assistant Professor Abell

15. Farm Accounts

Actual practice in the use of a simple system of farm accounting, including cost accounts suitable for the large or the small farm. Two two-hour laboratory periods a week.

Assistant Professor Abell

16. The Supply and Marketing of Farm Products in Massachusetts

The course will attempt to show what products New England can most profitably produce and how and when they can best be marketed. The principles of marketing, the importance of marketing as compared with production, the best outlets for sale, proper methods of preparation, packing, shipping, storing, advertising and selling, direct marketing, use of motor truck, trolley freight and express, collective selling, planning production with a view to marketing, will be some of the topics presented. Each student will be given an opportunity to study the market for some product in which he is interested. Twenty lectures. Original study of particular product.

Department of Agricultural Economics

17. Sources and Use of Agricultural Credit

The course deals with the need, the sources, the methods of obtaining farm capital in New England. When and when not to borrow; length of loan, methods of payment, interest, amortization, loan associations, Federal land banks, mortgage credit, personal loans, collateral, and like practical topics are discussed. Safe and unsafe securities, notes, bonds, stocks, and investments are discussed. Twenty lectures.

Department of Agricultural Economics

D. RELATED SUBJECTS

18. Botany

A study of the structure, functions, and diseases of greenhouse, garden, orchard, and field crops, together with methods of disease prevention, including spraying and the application of fungicides. Two lectures a week.

Mr. McLaughlin

19. Entomology

The Course in Entomology covers the topics outlined below. It is aimed to cover the fundamentals of the subject rather fully. Time will permit the discussion of only the more important of the injurious and beneficial insects with which we have to deal in this section of the country.

1. Insects and their nearest relatives — how to distinguish them.
2. Structure or make-up of insects and the practical application of this knowledge in insect control.
3. Development, metamorphoses (changes), and stages of insect life.
4. Composition, preparation, combination, and use of insecticides, fumigants, etc.
5. Spraying apparatus and its use.
6. Beneficial and injurious insects.
   - A. The life history, habits, behavior, and control of some of the most important insect pests of —
     - (1) Orchard and small fruit pests.
     - (2) Market-garden and field-crop pests.
     - (3) Greenhouse pests.
     - (4) Forest and shade-tree pests, and pests of ornamental plants.
     - (5) Domestic animal pests.
     - (6) Household pests and those attacking man.
     - (7) Insects and their relation to the transmission of disease; *i.e.*, how insects affect public health.
   - B. Beneficial insects.

Three lectures a week.

Associate Professor Regan

20. Farm Structures

The purpose of this course is twofold. First, to study the principles of arrangement and interior design of the various farm buildings, including the general-purpose barn, horse barn, dairy stable, milk house, tool shed, ice house, root cellar, poultry house, etc.; materials of construction, including concrete, wood, and iron; farm gates and fences; and second, to give practice in drawing and reading blue prints, to the end that the student will have a means of precisely expressing his design ideas, and thus be able to transmit them to a builder or contractor without ambiguity.

Practice will be given in handling Portland cement concrete in the rural engineering shop, where ample facilities are available. In the drafting room will be prepared one complete set of drawings to be worked up from any design problem selected by the individual student, and which will include the writing of appropriate specifications. Two lectures and one two-hour laboratory period per week.

Assistant Professor Strahan

21. Farm Machinery

This course is a study of the selection, use, and care of field implements, pumping equipment, and gas engines. Special attention is given to the application of the gas engine to automobiles and tractors. Practice is given in operating and repairing machines in the shop. Two lectures and three two-hour laboratory periods per week.

Professor Gunness

22. Rural Sanitary Science and Hygiene

Significance of sanitary science in the relation to health; the theories of disease; air and ventilation; water and its protection; sewage, disposal and purification; foods, their care, preservation, decomposition, and nutrition; vaccines and serum treatment; car-

riers of disease, immunity and susceptibility; infectious diseases; disinfection and care of infectious diseases. Two lectures a week.

Professor Marshall

23. Vocational Guidance

A course designed to show the woman who is interested in agriculture what opportunities there are for her in that field, and how she may best take advantage of them. The types of agricultural work for which women are best adapted will be discussed. A study will be made of some of the special problems which confront the woman farmer and of her best ways of solving them. One hour a week.

Miss Hamlin

E. HOMEMAKING

Owing to the increasing demand for instruction in homemaking, provision has been made in the winter school for a course combining homemaking with agriculture.

There are many women and girls throughout the State who are vitally interested in studying home problems and at the same time would like to become proficient in some phase of agriculture, as poultry, gardening, floriculture, or fruit growing. The college is able to extend this unusual opportunity.

Attractive laboratories have been newly equipped for homemaking work, and will be at the disposal of all women students in the winter school.

24. Foods

When one realizes that on an average about 30 or 40 per cent of the family income must be spent for food, it is easy to understand that this is one of the most timely topics of the day in the interest of thrift and health.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods. Emphasis will be given to the application of fundamental principles in planning balanced menus. An unwise choice of foods may result in sickness rather than health.

Consideration will be given also to such special problems as infant feeding and school lunches. This course will include laboratory work of practical value. One lecture and two two-hour laboratory periods per week.

Miss Skinner

25. Clothing

Textiles will be scarce for some time because the world wasted during the war its reserves of clothing and household supplies. Therefore consideration must be given to making over and extending the use of fabrics as well as the selection of new materials.

Their character, cost, and durability are studied with reference to planning a wardrobe for a limited income, emphasizing the beauty of simplicity and suitability. There will be practical work in sewing and making garments. One lecture and two two-hour laboratory periods per week.

Department of Home Economics

26. The Business of the Household

Good management is a science. For generations women have failed to apply to the business of homemaking many efficient methods so successfully used in the business world.

Since the homemaker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equipment, the use of time and labor-saving devices. Three class hours per week.

Miss Skinner

27. Home Care of the Sick

Health preservation and home care of the sick are of prime importance at the present time.

It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of family health.

However, every homemaker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured. Three class hours per week.

Miss Skinner

F. VOCATIONAL AGRICULTURAL TEACHING

Under a joint agreement with the Massachusetts Board of Education the training of teachers of agriculture for vocational schools is undertaken by the Massachusetts Agricultural College in the following lines: —

1. Regular college courses, four or five years, leading to a degree.
2. Shorter courses to supplement the training of more mature men who are partly qualified through practical experience, or through scientific study of agriculture, or through study of methods and principles of education, or through teaching experience.
3. Professional improvement training for employed teachers in regular college courses, or courses in the winter term, or courses specially organized on request of a sufficient number of students.

The Winter Short Course period provides in part for the second and third lines. An intensive course during the first two weeks is provided for the instructors who may leave their teaching for only a brief period. This course may be continued on a lighter schedule for such persons as may be able to remain throughout the winter term.

For all of these there will be an opportunity to take courses in general agricultural teaching, special Massachusetts problems, and agricultural subject-matter. An attempt will be made to furnish any subject-matter course which enough men may request.

High school principals and science teachers who have had farm experience, or practical agriculturists, may find this an opportunity to qualify for vocational teaching, — a field in which the demand keeps ahead of the supply.

The educational courses supplemented by an adequate amount of agriculture will be credited by the Board of Education towards approval of candidates or for professional improvement programs. Similar courses are offered in the summer school.

Principles and Methods of Teaching

The aim of this course is to present fundamental principles of teaching. It treats such topics as interest, apperception, imaging, reasoning, and other activities of the mind in its learning processes. It should precede or accompany courses in special methods. Five exercises per week.

Professor Hart

Special Methods in Vocational Agricultural Teaching

This course consists of intensive work on some of the most important phases of teaching vocational agriculture. These may be the planning of a lesson or a series of lessons, the teaching of the lessons planned, and the supervision of study. Projects as related to the class and study work will be taken up.

In case both experienced and untrained men apply for this course the group may be divided into two sections. Five exercises per week.

Professor Welles

Summer School Courses

During the summer school, in addition to the above, courses for college credit, also advanced work toward graduate degrees, will be added, including courses for training directors and supervisors.

Professional Improvement Problems I

A seminar course for prospective teachers of vocational agriculture and employed teachers with limited experience. Deals with the Massachusetts system as it is and the problems confronting the instructor. Similar to Course II, which is intended for more experienced instructors or those who have attended a similar course before this season.

Under special arrangement of the Massachusetts Board of Educa-

tion and the Massachusetts Agricultural College, students in this course may be admitted to Professor Hart's course in principles and methods of teaching.

Class meets for double periods five days each week for first two weeks. May be continued, on request, for a longer term at four days each week.

Mr. Heald

Professional Improvement Problems II

A seminar course for employed teachers or directors of vocational agriculture, dealing with problems which constantly arise in the agricultural schools of the State. Includes plans for the coming season and campaigns for improved methods based on experiences of men in service; for this season special emphasis on skill in questioning as applied to different phases of vocational teaching and methods of co-ordinating class instruction with maximum individual progress.

Under special arrangement of the Massachusetts Board of Education and the Massachusetts Agricultural College, students in this course may be admitted to Professor Hart's course in principles and methods of teaching.

Class meets for double periods five days each week for first two weeks. May be continued, on request, for a longer term at four days each week.

Mr. Heald

SHORT COURSES AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

The Massachusetts Agricultural College offers through its short course administration the following schools and courses for 1919–20: —

The Two-Year Course in Practical Agriculture.
The Ten Weeks' Winter School.
The Summer School.
The One-Year Vocational Poultry Course.
The One-Year Rural Engineering Course.
The Regional School.

The Two-Year Course

The Two-Year Course in Practical Agriculture is designed for young men and women, seventeen years of age or over, who have at least a common school education. This course was begun in December, 1918, with an enrollment of 37 students. The small enrollment was due to the fact that young men of military age were subject to the draft. Two hundred thirty students have enrolled this year.

The Two-Year Course in Practical Agriculture is so arranged that the student receives instruction in fundamental subjects, and is given an opportunity to select the lines of work during the second year in which he is particularly interested.

The first year consists of six months of study at the college. The term begins with the college fall term and closes with the winter term of the regular session. The same vacation periods are observed as in the regular four-year course. The student pursues during the first year two courses in soil fertility, two courses in animal husbandry, two courses in fruit growing, one course in farm machinery, one in shop mechanics, one in dairying, one in poultry, one in farm structure, one in hygiene, and one in farm law.

At the close of six months of study, students are required to gain six months of farm experience. The college will assist students in

finding positions and in placing them on farms where the experience gained will be of great advantage. Thus, an effort will be made to place on a dairy farm the man expecting to take up dairying as his chief line of work, and a student of pomology on a fruit farm.

During the second year the student spends nine months in resident study. Courses in plant diseases, crops, insect pests, feeding, farm management, marketing, and farm problems are required of all students.

In addition, the student selects from the following list of subjects three which he will carry throughout the year: fruit growing, dairying, poultry husbandry, vegetable gardening, forestry, floriculture, and rural home life.

During the winter and spring terms of the second year there are elective subjects from which the student may complete his program. These courses include: breeding, animal diseases, gas engines, dairying, carpentry, drainage and irrigation, agricultural credit, farm manufacturing, and dairy bacteriology.

The course is not intended for students enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement either from the principal of the high school or from parent or guardian asking permission to be enrolled.

This course will appeal not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming. Although the course is planned to meet the needs of those who are not graduates of high schools, the instruction is not preparatory or elementary in its nature, but is so arranged that it will be of value to all. The greater amount of academic training that some of the students may possess will in a measure be offset by the fund of practical knowledge possessed by many who have completed only the elementary schools.

The Ten Weeks' Winter School

The ten weeks' winter school is described in this bulletin. It was first organized about 1900, and has proved to be very popular with a more mature class of students.

The Summer School

The 1919 summer school was under the joint direction of the Massachusetts Agricultural College and the Massachusetts Board of Education. Twenty-five courses were offered in agriculture and horticulture, and nineteen courses in education. The enrollment was the largest in the history of the college. The plan of co-operation will be continued during 1920, additional courses being offered to those who attended the 1919 summer school.

A One-Year Vocational Course in Poultry Husbandry

J. C. Graham, Loyal F. Payne, Luther Banta, *Instructors*

This course is designed for graduates of the agricultural vocational schools and others who wish to take a truly vocational course and can spend one year only at college. This course, beginning when college opens in the fall and extending through the college year, is limited to 12 students.

The institution of this One-Year Vocational Course in Poultry Husbandry is to meet the needs of those who wish to specialize in this branch of agriculture and who feel they cannot spend either two or four years in doing it. This course is intermediate between the college course and the ten weeks' short course, and is designed to prepare the student for practical poultry keeping, either for pleasure or for profit. "Learn to do by doing" is our motto. The general plan is as follows: the student devotes all his time to poultry work from the opening of college to January 1, at which time he drops all poultry courses except one course and takes about 15 credits in winter school work. From the close of the winter short

course, about March 19, until college closes, he again devotes all his time to poultry work. As will be seen, the short course brings the student in contact with other members of the faculty and acquaints him with important correlated work. As the class is limited to 12, it will be well for those who wish to take advantage of it to apply at once.

Applicants must be at least eighteen years of age and have a good elementary education.

There is no tuition for residents of Massachusetts, but a laboratory fee of $5 is required for the fall term and the same for the spring term.

For further information concerning this course, write Poultry Department.

Plans are now being made to begin the one-year poultry course next year in December, to continue until the following December.

The One-Year Rural Engineering Course

The One-Year Course in Rural Engineering was organized at the college in 1919. This course offers instruction in drawing, English, farm machinery, forge shop, gas engines, mathematics, and physics.

DIRECTORY OF INFORMATION

A. The College

Those desiring college catalogues, the President's annual report, and other pamphlets giving full information relative to entrance requirements, courses of study, expenses, opportunities for student labor, and so forth, should address Ralph J. Watts, Secretary, Amherst, Mass.

All questions regarding admission to the college, either to the freshman class or to advanced standing, should be addressed to Prof. P. B. Hasbrouck, Registrar, Amherst, Mass.

B. The Experiment Station

The Experiment Station conducts investigations in as many lines of agricultural science and practice as its funds will permit. It has charge of the inspection of commercial fertilizers, commercial feeding stuffs, and milk-testing apparatus. Branch stations in cranberry and asparagus culture are maintained in other sections of the State.

The station considers the farmers' problems to be its problems, and desires to keep in touch with them.

Requests for bulletins reporting the results of experiments and inspections, and for other information on the work of the station, should be addressed to Fred W. Morse, Acting Director of the Experiment Station, Amherst, Mass.

C. The Graduate School

Questions relating to courses offered leading to the degrees of Master of Science and Doctor of Philosophy, admission and work required, should be addressed to Dr. Charles E. Marshall, Director of the Graduate School, Amherst, Mass.

D. The Extension Service

Inquiries of a general nature regarding the work of the Extension Service, extension publications, or requests for new lines of work should be addressed to John D. Willard, Director of Extension Service, Amherst, Mass.

E. Short Courses

For information concerning the Short Courses, the Two-Year Course in Practical Agriculture, the Ten Weeks' Winter School, the Summer Schools, write or apply to John Phelan, Director of Short Courses, Amherst, Mass.

THE MASSACHUSETTS AGRICULTURAL COLLEGE

TEN WEEKS' COURSES

Application Blank

I hereby make application for admission to the Ten Weeks' Courses which are to begin Dec. 30, 1919. I am enclosing the registration fee of five dollars ($5) in cash, check or money order. (Designate which one.)

Name (Mr., Mrs., or Miss) .....
Date of birth ..... Date of application .....
Street address ..... Post office .....
State ..... Present occupation .....
Previous education .....
Reference (name and address) .....
.....
Name and address of person to notify in case of illness or accident .....
.....

Check subjects you wish to take and mail blank, enclosing fee, to JOHN PHELAN, Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

Group A. General Agriculture

- Soil Fertility
- Field Crops
- Types and Breeds of Livestock
- Livestock Feeding
- Animal Breeding
- Dairying
- Dairy Bacteriology
- Animal Diseases
- Poultry Husbandry

Group B. Horticulture

- Fruit Growing
- Market Gardening
- Floriculture
- Horticultural Manufacture

Group C. Farm Business

- Farm Management
- Farm Accounts
- The Supply and Marketing of Farm Products in Massachusetts
- Sources and Use of Agricultural Credit

Group D. Related Subjects

- Botany
- Entomology
- Farm Mechanics
  - Gas Engines
  - Tractors
- Rural Sanitary Science
- Farm Structures

Group E. Homemaking

- Foods
- Clothing
- The Business of the Household
- Home Care of the Sick

Group F. Vocational Agricultural Teaching

NOTE. — Registration fee must accompany this application. Make check or money order payable to the MASSACHUSETTS AGRICULTURAL COLLEGE.

Fee .....
Date received .....
Reference .....